



# ***airlift***

**WORLD AIR TRANSPORTATION**

*In this Issue:*

- RED TAPE . . . BIG MERGER OBSTACLE
- CONVAIR'S 880 IS READY TO GO
- EXCLUSIVE: JET PILOT'S REPORT

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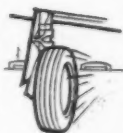
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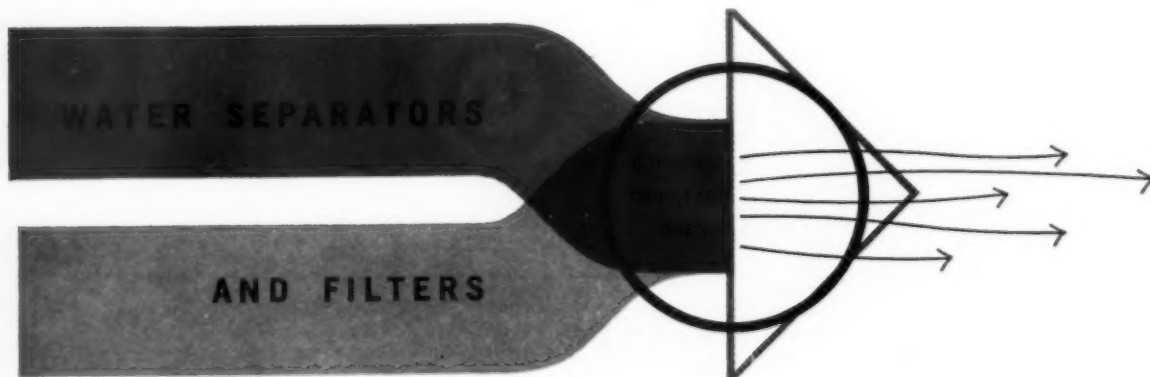
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FEBRUARY, 1960

3

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**SUBSCRIPTION RATES** Single copy 50¢. For U.S. Possessions, Canada, and Postal Union Countries 3, 5 & 6—\$3.00 for 1 year, \$5.00 for 2 years, \$6.00 for 3 years. Other countries—\$5.00 for 1 year, \$9.00 for 2 years, \$12.00 for 3 years. Subscriptions limited to aviation industry personnel. For further information, write: Circulation Promotion Manager, AIRLIFT, 1001 Vermont Avenue, N.W., Washington 5, D.C.**CHANGE OF ADDRESS** Send old address (exactly as it appears on mailing label on your copy of magazine) and new address, including zone number if any to Circulation Service Manager, AIRLIFT, 1001 Vermont Avenue, N.W., Washington 5, D.C. Allow two weeks for change.**INCORPORATES** Airports and Air Carriers; Aviation Equipment; The American Pilot; Aviation Sales & Services; U.S. Aviation; American Airports; Airports & Heliports and American Airports. All rights to these names are reserved.**PUBLISHING INFORMATION** Published once a month by American Aviation Publications, Inc., Washington, D.C. Printed at The Telegraph Press, Harrisburg, Pa. Second class postage paid at Washington, D.C., and at additional mailing offices.Wayne W. Parrish ..... President & Publisher  
Leonard A. Eisner ..... Vice Pres. & Gen. Mgr.  
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FEBRUARY, 1960

# airlift

(U.S. Reg. Pdg.)

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**ON THE COVER:** Convair's 880, set for start of service within the next two months by both TWA and Delta Air Lines, moves down the production line at San Diego. For a timely preview of the 880, including specifications, performance details, system highlights and an account of its lively progress through certification, be sure to read William Coughlin's four-page roundup in this issue, pages 22 through 25.

## AVRO 748 AVRO 748 AVRO 748 AVRO 748 AVRO 748 AVRO 748

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## A Second-Year Look at FAA and Quesada

This is starting out to be a rough year for civil aviation—rough all over. The airline safety record, the continued series of mishaps, Congressional investigations, the burgeoning regulatory empire of FAA, inspection crusades, new and tougher rules, bitter competition for traffic, soaring subsidy requests, all climaxed by a renewed spate of name-calling in the public prints, add up to a first-class fracas.

It's all happened before. Several times. But much more is at stake now. And the public is more directly concerned now—airlines are no longer supplementary transportation, but primary.

The one man who will take it most on the chin in 1960 is FAA Administrator Elwood "Pete" Quesada. The honeymoon is over. He could have quit while he was ahead before the end of the year, but Quesada is not one to exit half-way through a two-year commitment to the President. As is usual in such circumstances, he'll be blamed for some things even beyond his control, and certainly for all of the sins and omissions of his subordinates.

And before things get too far out of hand, let it be said that Pete Quesada has contributed much that is good to civil aviation in his first year of office. He rammed through navaid benefits which had been stalled, he fought for appropriations, he cut red tape, and he got FAA on the road. Let it be said irrespective of any other appraisals that his intentions and motivations have been sincere and he had the courage to stick out his neck and fight.

But FAA has become an enormous empire, a big, sprawling and growing bureaucratic mechanism which is getting increasingly arbitrary and dictatorial. It also presents a staggering management problem. If you want to get a shocker, look at the personnel growth and forecast:

June 30, 1957	21,510
June 30, 1958	25,805
June 30, 1959	33,624
June 30, 1960	38,600 (est.)
Dec. 31, 1960	41,000 (est.)

This is almost doubling in three and a half years. Recognition must be made of the take-over by FAA of responsibilities and functions which CAA never had. Airways traffic control requirements have spiraled. Nonetheless, one of the roots of the FAA problem of 1960 is a vast organization rapidly put together and headed by an Administrator who is a one-man show.

In his zeal for action, Quesada has stirred up quite a few hornet's nests, not the least of which is the Air Line Pilots Association. It is doubtless high time that someone pointed out to both Clarence Sayen, ALPA president, and to Mr. Quesada, that exchanging re-

criminations over procedures in the public print is not the way to accomplish better and safer air transportation. Both the airlines and the air traveling public are entitled to higher efforts, particularly so because both Sayen and Quesada are aiming for identical objectives.

One of Mr. Quesada's proposals which trod on sensitive toes was mandatory retirement of pilots at age sixty. Another is his new co-pilot proficiency regulations which it is estimated will cost the airlines not less than \$10 million more this year. A third activity producing a lot of heat is the FAA's "crash-type" campaigns of airline inspections which, on the record, have resulted in a lot of overtime pay checks for inspectors but no diminution of mishaps and accidents.

The pilot age issue will be fought out through the courts and elsewhere, but it may be pertinent to question whether the issue is not whether "old men" should be permitted to fly airplanes, but whether an administrative agency of government is to be permitted to set itself up as a "court of review" in matters which may very properly be those of company policy. But airing the issues emotionally in the press about the safety of flying at over age sixty until more facts are known is not designed to instill confidence in the traveling public.

On the co-pilot proficiency issue, it is a fundamental fact that no airline would hesitate for a minute to spend any amount of money necessary for the proper qualification of its flight personnel. Airlines cannot be blamed for protesting what they consider to be excessive costs, even though FAA has a right and a duty to exercise vigilance over pilot proficiency in general. This situation seems to have run from one extreme to another.

By the same token, there is no question about the value of periodic check rides and inspections to guard against laxities on the part of both pilots and ground crews. Pilots can and do become lax. But the whole purpose of vigilance can be defeated by employing methods that arouse resentment.

We would like to suggest to Mr. Quesada that he hold a series of steam-valve open forums with each of the groups which is now blasting him and FAA. CAB might well participate. State the policies, answer questions, listen to the gripes. This would at least be preferential to writing letters of recrimination which are released to the press. Debates and discussions are in order, but they should be in face to face meetings. A rough year might be less rough by so doing.

Wayne W. Parish

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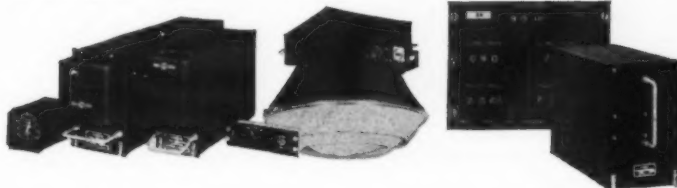
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137Y-1 Antenna

NC-103 Computer System

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For further information and technical specifications write to Collins Radio Company, Aviation Sales, Cedar Rapids, Iowa.



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# Delta DC-8 Jets link 7 Great American Cities\*



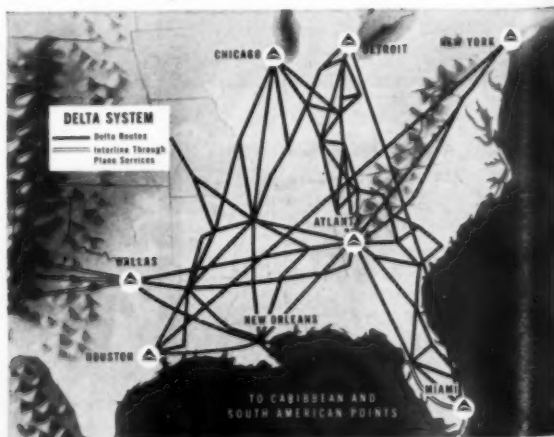
—with luxury and economy on every flight

Delta's magnificent new DC-8's have pioneered jet speed and comfort between North and South. The DC-8, planned for *passengers* from its inception, sets a new standard of luxury for first class travel and also provides equal speed plus economy in a thrifty supercoach section on every flight.

\*As additional aircraft deliveries and availability of adequate airport facilities permit, Delta will extend its jetliner service to many more cities in addition to those shown on the route map below.



Delta's Royal Jet Service features luxurious reclining seats with individual tables, champagne luncheons and dinners in first class; hot meals in supercoach.



Sample flight times: Atlanta-New York, 108 min.; Chicago-Miami, 2 hrs. 47 min.; Dallas-Atlanta, 100 min.; Detroit-Miami, 2 hrs. 46 min.



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AIR LINES



### Values IATA Contacts

To the Editor:

Although the chief executive of a member airline of IATA, albeit a small one, it is from *AIRLIFT* (Dec., 1959) that I learned of the decision of the executive committee of IATA to seek the exclusion of representatives of aircraft manufacturers from attendance at the annual general meeting of IATA.

The views of this airline were not solicited and I feel constrained to say how much I regret the action which is apparently being taken.

The past opportunities for senior executives of one of the smaller airlines in a comparatively remote part of the world to meet executives of aircraft industries of several nations, have been welcomed; valuable contacts—and friendships—have been established. Much useful and up-to-date information has been gleaned, and generous hospitality, in good company, has been enjoyed.

Such opportunities for some of the smaller airlines to meet aircraft manufacturers in person are few and far between—more especially when prospects of sales for such airlines within the foreseeable future are remote—a fact which does not lessen the desire of the airline people concerned to keep themselves *au fait* with current developments and thinking.

One cannot but feel that perhaps the manufacturers have also derived some benefit from such regular contacts.

To my mind the outcome, as reported, detracts from the value of IATA AGM's and is, in more ways than one, an unhappy one.

Thank you, manufacturers: American, British, Dutch and French. I am sorry that I may not see you in Copenhagen this year.

MAX STUART-SHAW  
General Manager  
Central African  
Airways Corporation  
Salisbury, Southern Rhodesia

### A Busy Airplane

To the Editor:

Somebody's statistics are slipping. In the January "Briefs" you report that Trans-Canada's first Viscount has logged its one-millionth air hour.

Had this harbinger of the North American jet age remained constantly airborne since April of 1955 it would not nearly have accrued the total you allege. And even the doughty Viscount must land occasionally.

C. E. NASH  
General Manager of  
Production Planning  
Capital Airlines  
Washington, D.C.

Ed. note: TCA's Viscount fleet, that is.

### In Defense of MATS

To the Editor:

In reply to your article, "Quesada O, Douglas O, Cargo O," and the letter to the editor which you published in the Nov. issue of *AIRLIFT*, I would like to inject some ideas of my own on the subject. I would appreciate your publishing the other side of the story for a change. I have read of the coming "revolution"

in air cargo and of the equipment about to be phased-in to handle the task in publications such as *AIRLIFT* and other comparable magazines with greatly aroused interest and was provoked to learn the fate of the Lockheed Super Hercules and its Allison T61 engine. The Super Hercules was to have undoubtedly been the chief competitor to the Canadair CL-44. That Allison was given no financial aid to further work on the T61 when at least one engine had reached the test stand stage of development was enough to discourage any prospective purchasers from waiting when competitors had already placed orders for the CL-44. (Why wait 'til '61 or later for a plane which employs the same British engines used in a similar aircraft produced by a division of General Dynamics, a major American corporation?) Yet two companies hung on, and unable to finance development of the Super Herc, the two canceled their orders. All this because further expansion and re-equipment of MATS was successfully thwarted by those in opposition.

Perhaps we are overlooking something vital to our form of government, which we hold to be superior to all others. One ingredient necessary to make free enterprise work ideally is competition. In other words, let there be no monopoly. No industry is more representative of keen competition than the aviation industry. In practically every application there are at least two or three aircraft of comparable speed, payload, power, gross weight, etc. The 707 and DC-8 are classic examples. We have seen that the competition is global.

### When & Where

#### FEBRUARY, 1960

- Feb.—Flight Engineers, board meeting, New York.
- Feb. 8-10—National Association of State Aviation Officials, board of directors meeting, Washington, D.C.
- Feb. 8—IATA traffic handling & accountancy working group, 7th meeting, Munich.
- Feb. 22—IATA reservations working group, 8th meeting, Munich.
- Feb. 22—Joint ATC/IATA reservations committee, 10th meeting, Munich.
- Feb. 23—ICAO, European-Mediterranean RAC/COM meeting, Paris.

#### MARCH, 1960

- March 7-8—Flight Safety Foundation, 5th annual business aircraft safety seminar, Dearborn Inn, Dearborn, Mich.
- March 8-11—ATA agency committee meeting, ATA conference room, Washington, D.C.
- March 10-11—Institute of Aeronautical Sciences, flight propulsion meeting (classified), Cleveland.
- March 17-29—ICAO, fifth North-Atlantic Ocean stations conference, The Hague.
- March 21-April 9—ICAO, sub-committees of legal committee on Tokyo draft convention and draft convention on aerial collisions, Paris.
- March 21-24—IRE international convention, Waldorf Astoria Hotel & Coliseum, New York.

#### APRIL, 1960

- April 5-8—SAE national aeronautic meeting, Hotel Commodore, New York.
- April 8—Air Freight Forwarders Assn., Waldorf Astoria Hotel, New York.
- April 25-May 14—ICAO, teletypewriter panel, Montreal.
- April 26-28—Airlines Electronic Maintenance Meeting, Hollywood-Roosevelt Hotel, Hollywood, Calif.
- April 27—IATA medical committee, 10th meeting, Miami.
- April—AEEC meeting, Hotel Statler, Washington, D.C.

The articles previously mentioned were in my opinion biased and prejudiced to a great extent. No over-all view of the picture was apparently taken. The welfare of all aviation was not considered. After all, any organization needs to phase-in new equipment when the current lot becomes obsolete, and MATS is no exception. The best commercial cargo service can come about only when there are competitive aircraft as well as competitive carriers.

Finally, may I say that *AIRLIFT* is a very informative magazine, and I enjoy reading it each month. Perhaps I am wrong about my preceding remarks, but I think a big mistake has been made.

RONALD G. CAWOOD  
1023 Richard Avenue  
Chattanooga, Tennessee

Ed. note: *AIRLIFT's* sole beef with MATS is competition which the government/military airline gives to private enterprise. More power to MATS in developing and ordering equipment in line with its historic mission. MATS needs much more special-purpose equipment and *AIRLIFT* heartily endorses all efforts by MATS to obtain funds for such objectives. The T61 most certainly needs to be pushed.

### Praises Alitalia Story

To the Editor:

I speak for our Rome management and our worldwide organization as well as our North American staff in expressing appreciation for the excellent profile on Alitalia appearing in your December issue of *AIRLIFT*.

To our knowledge, Anthony Vandyk is the first person to write authoritatively of the trials and tribulations of reestablishing Italy as a world power in commercial aviation. We think so highly of his well researched efforts and of the stature of your magazine that copies have been dispatched to all our offices.

FABRIZIO SERENA DI LAPIGLIO  
Gen. Mgr. for North America  
Alitalia

### Maxaret, Not Messier

To the Editor:

We refer to your article "How's the Caravelle Doing? . . . Fine" (Dec., p. 50). For your information we wish to make it clear that the antiskid device fitted on the Caravelle is not the Messier Ministop (as stated) and the entire braking system is not of Messier make.

M. ALLAIN  
Sales Manager  
Messier  
Montrouge, France

Ed. note: *AIRLIFT* apologizes to Messier. Caravelle actually uses the British Maxaret antiskid device.

### Few False Warnings

To the Editor:

Your comment entitled "Cold feet aboard Comets" on page 78 of the September issue makes reference to false fire warnings as causing one of the difficulties

B.F. Goodrich



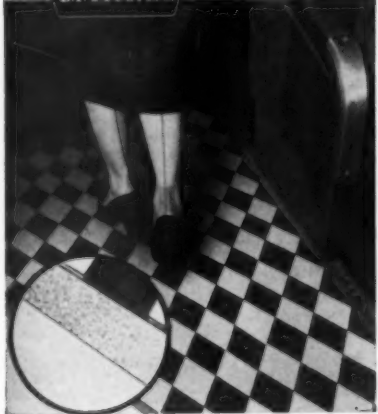
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## LETTERS

during the shakedown period on the BOAC Comet 4.

Graviner supplies the fire detection equipment on this aircraft and one of the moral responsibilities is to keep a very careful eye on the performance of this equipment on any aircraft to which it is fitted. It is agreed that, no matter how they are caused, false fire warnings are serious occurrences.

BOAC is now operating 15 Comet 4s which have totaled in all 21,111 flying hours. During this period, there have been four false fire warnings, of which only two occurred in the air. This results in an in-flight incident rate of one false warning per 10,555 flying hours, a figure which we submit is good by any standards. Nevertheless, this figure is capable of improvement and if current trends are maintained, it most certainly will be improved.

SIR VERNON BROWN, Director  
Graviner Mfg. Co., Ltd.  
London

### Barber-Colman, Too

To the Editor:

We would like to call your attention to the last paragraph on page 36 of your October issue on the airconditioning system on the DC-8. It reads as follows:

"The DC-8 cabin pressurization and temperature control system by the Carrier Corp. of Syracuse, N.Y. is a masterpiece of efficiency with an unusually low weight factor, according to Douglas. The problems of maintaining 8,000 ft. cabin pressure when the jetliner is actually flying at 40,000 ft., with outside temperatures ranging down to 100 degrees below zero, was not a simple one."

We believe that this statement may have been used out of context as Carrier supplies only the refrigeration system (this is correctly noted on page 61). Barber-Colman Co. supplies the temperature control systems for the cabin and cockpit. AiResearch, Stewart-Warner and Kollsman also supply equipment for the complete DC-8 cabin pressurization and temperature control system.

S. D. REED  
Barber-Colman Co.  
Rockford, Ill.

### Boost for JET-PAKS

To the Editor:

Page 30 of your Dec. issue carries an article titled "Air Force Phaseout on Assault Transports May Scuttle Army's New Airlift Plan."

This article makes the point that the rapid retirement of C119 aircraft, along with several other models, will severely restrict the mobility of our Strategic Army Corps. As an economy measure, the USAF has cut its inventory of C119s from 728 in fiscal 1959 to 400 in 1960 at the end of which their use will be completely terminated.

The article mentions that the Army's transportation consultants have recommended certain immediate measures to increase the USAF inventory of long range heavy transports as well as retention of C119s through fiscal 1964.

As one solution to the USAF's desire to

cut inventories and expense while the Army campaigns for increased airlift capacity, I would like to "blow the horn" for our JET-PAK auxiliary thrust units.

These are small jet engines, completely self-contained in individual pods which we manufacture and supply as integrated kits of all necessary components and controls for easy installation on large aircraft. The benefits and practicability of our JET-PAK's have been well confirmed by over three years of operation on our commercial modification of the Fairchild C82, an earlier model of the C119.

We are now offering a 3400 lb. thrust JET-PAK for installation on C119s. Because of inadequate single engine performance, the USAF and other C119 users have been operating these aircraft at gross weights of approximately 64,000 lbs. Installation of our JET-PAK 3400 permits operating the C119 at its present structurally limited maximum gross weight of 77,000 lbs. while endowing it with one engine out performance that matches that of the conventional C119 at a gross weight of only 51,000 lbs. In effect, the JET-PAK 3400 permits doubling the C119's payload simultaneously increasing its performance and its safety margins when operating with one engine out.

Furthermore, it is interesting to note the Army's transportation consultants, in specifying desirable characteristics for an aircraft to replace the C119, called for a 25,000 lb. payload over a 150 nautical mile radius. Installation of our JET-PAK 3400 permits the C119 to exceed this performance requirement easily.

The USAF could either double the lifting capacity of its present inventory of C119s through installation of our JET-PAK 3400s or could cut its inventory in half and still retain present capacity.

Your coverage of military air transport developments in *AIRLIFT* along with your excellent handling of commercial air transportation is much appreciated. Keep up the good work!

F. H. STEWARD, President  
Steward-Davis, Inc.  
Gardena, Calif.

### Good On-Time Record

To the Editor:

I have been following the data you are presenting on the subject of schedule reliability with interest. In our current contract with MATS, on-time departure is a significant aspect of the service we supply.

We are flying 32,494,780 passenger miles per month in transatlantic service with DC-6's, and 77,021,210 passenger miles in transpacific service using DC-7's. I am pleased to note that our on-time departures (0—15 minutes) have been 79% and 85% in the Pacific for Oct. and Nov., and 92% and 96% in the Atlantic. This includes origination and all transit points. Our DC-6 daily aircraft utilization is 10.7 hours and our DC-7 utilization is 11 hours.

As a supplemental air carrier we are justly proud of our contributions in the field of dependable and economical air transportation.

GEORGE W. TOMPKINS, President  
Overseas National  
Washington, D.C.



## UNITED AIR LINES SELECTS BENDIX DOPPLER NAVIGATION

When it starts service between California and Hawaii early in 1960, United Air Lines' new DC-8 Jet Mainliner fleet will be equipped with Bendix® DRA-12 Doppler Radar. This new navigation system provides complete ground speed and course deviation data continuously and automatically without dependence on ground facilities.

\*REG. U. S. PAT. OFF.

### Bendix Radio Division

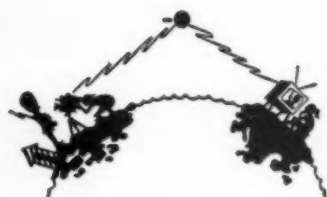
AVIONICS GROUP - BALTIMORE 4, MARYLAND

Export Sales & Service: Bendix International, 205 E. 42nd St., New York 17, N. Y.





How a  
communications  
satellite can  
bring you *live* TV  
from anywhere  
in the world



World-wide *live* TV, with no cable or radio relay costs, can develop from outer-space research by government and industry

Among the peaceful applications for scientific break-throughs being made in the study of outer space is a communications satellite.

Using inflated plastic satellites, boosted toward orbit by the Air Force *Thor* rocket, a global TV network could be established. TV signals would bounce to satellite and back to your station, giving you a front-row seat at events anywhere in the world. Cost should be a fraction of coaxial cables and microwave relays now used.

Practicality of *Thor* for this purpose is based on its demonstrated reliability. With Douglas responsible for airframe fabrication and assembly and test of the entire system, *Thor* has helped launch 84% of all payload weight put into space by the U. S.; is the key booster in the Air Force "Discoverer" firings; launched the first nose cone recovered at ICBM range.

*Thor* is another product of the imagination, experience and skills which Douglas has gained in nearly 20 years of missile development.

Foil-covered satellite, folded like a pocket raincoat, would balloon out in orbit as an inexpensive TV relay station

**DOUGLAS**



Builders of the  
DC-8 Jetliner

MISSILE AND SPACE SYSTEMS • MILITARY  
AIRCRAFT • TRANSPORT AIRCRAFT •  
AIRCRAFT • GROUND SUPPORT EQUIPMENT

AIRLIFT



**More Service,  
More Subsidy**

**Subsidy bill continues to rise**, may cause repercussions in Congress. President says proposals will be considered to reduce subsidized carriers' dependence on the government, but he doesn't elaborate. However, it's known that Bureau of the Budget has already asked CAB for ideas on legislation providing "subsidy control." One proposal: a \$70 million ceiling. Local airlines' fiscal 1961 subsidy, shown in new budget, will be \$55,434,000, up 11.3%. Bigger jump came in 1960, up 32.7% from 1959. Reason: many route awards, costs connected with new planes, higher operating expenses. Locals, helicopters (\$4.7 million) and Alaska lines (\$7.9 million) will cost \$68.1 million in 1961. Retroactive payments, other adjustments increase total obligation to \$71.6 million.

**Trunks had biggest December** in history. Passenger-miles reached 2.37 billion, available seat-miles 4.06 billion, load factor 58.41. Comparison with same 1958 period isn't possible because of strikes in that year. December coach traffic was 18.4% ahead of November 1959; first-class showed no gain.

**Some Doubts  
About Fuel Tax**

**Aviation fuel taxes probably won't be increased** this year. Fiscal 1961 budget asks boost in avgas tax from 2¢ to 4½¢ a gallon, also wants 4½¢ on presently untaxed jet fuel. Proposal got nowhere last year; increase is unlikely in 1960, an election year. Only possibility: levy on untaxed jet fuel, and then only if Congress also explores taxes in non-aviation areas. Government says requested increases would raise 1961 revenues by \$89 million, of which \$50 million would be from jet fuel. Industry sources, looking ahead, say 4½¢ tax on both fuels would put fiscal 1962 tax bite at \$118.4 million, 1963 at \$128.2 million. The 2¢ tax will cost \$23 million in 1960.

**Here's a tough airfreight problem:** While freight rates have come down, cost of moving goods to and from airports via truck is up. Result: on a small package traveling New York-Chicago, ground charges at each city for maybe 20-30 miles of trucking are almost as much as charge for 713-mile air move. With upcoming turbines, air rates will drop further, will be lower in some cases than truck tariffs. Hope is that bigger freight volume will enable truckers to cut charges by spreading costs.

**More Coordination,  
But More Freedom**

**Look for at least two significant recommendations** from Commerce Department's \$200,000 study of federal transport policy: (1) that government have a coordinated policy among regulatory agencies (CAB, ICC, etc.), and (2) that the various elements of transportation, being highly competitive, be given greater freedom in setting rates. Report probably won't be made public until late this month or early March.

**Past sins and omissions** of CAA and CAB continue to catch up with FAA Administrator Quesada. Newest example: flight recorders. Two years ago airlines pleaded for delay in rulemaking, urged that new, improved recorders be developed. Minneapolis-Honeywell was well on the way to development of one such unit. But CAB safety regulation staff, under extreme political pressure, said no delay. Airlines bought existing recorders and M-H, with a disappearing market, dropped its project. Now Quesada states his wishes: the same type of improved recorder virtually driven out of existence two years ago by CAB.

**Army Airlift  
Makes a Gain**

**Army is finally getting more support** for airlift expansion. Fiscal 1961 budget provides \$136 million for aircraft and helicopters, up 35% from 1960. Included are funds for first production quantities of Vertol Chinook helicopter. Other purchases: de Havilland Caribou twin-engine transport, Bell Iroquois utility helicopter. By mid-1961 Army will have 2,951 planes, 2,840 helicopters.

**Cargo jet price tags** are making those of plush passenger predecessors look like real bargains. Latest figures indicate proposed Boeing 735-30 will sell for \$8,025,000. This presumably is high-wing turbofan being considered by Boeing.

**Merger Lure  
For Independents**

**Merger of Britain's independent airlines** into three or four strong groups is favored by Aviation Minister Duncan Sandys. He'll then ask Parliament to give them more freedom to compete with government airlines. Outspoken Sandys, in office only a short time, has already laid down policy that resulted in merger of British aircraft manufacturers. He's also on record as supporting supersonic transport development.

# FLIGHT NO.

# ARRIVAL TIME

F-57-10

~~2:57~~  
ON TIME

F-57-7

~~2:34~~  
ON TIME

F-57-14

2:40  
ON TIME

F-57-55

2:12  
ON TIME

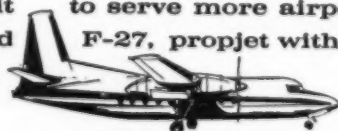
F-57-15

2:57

2:20



**Operation Dependability.** The Fairchild F-27 is the propjet airlines rely on. Its modern equipment assures dependable operation and permits pilots to select the smoothest, most direct course to their destination. Outstanding short field capabilities enable it to serve more airports than any aircraft in its class. This is the Fairchild F-27, propjet with on-time dependability.



**FAIRCHILD F-27**

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Brist  
land  
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stron  
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Airc  
Visco  
medic  
West  
Saunc  
Co.  
Helic  
Saunc  
192;  
WS-6

FEBRU



## Air Safety Climbs the Hill

Air safety—a never-ending topic for industry technical discussion—moved onto Capitol Hill and the meeting rooms of Senator A. S. "Mike" Monroney's aviation subcommittee. With the shift came a confusing mixture of recommendations, charges, countercharges and even some apparent publicity-inspired catch-phrases analyzing what nobody has yet been able to explain—that 1959 dip in air safety.

One by one, here's how aviation leaders, government and industry, appraised the situation:

**CAB Chairman Durfee**—*The record is not extraordinary when viewed in its proper perspective. If anything, it has disclosed that increased attention must be given to the fundamentals of safety—careful training, maintenance, operations in general.* Virtually beyond interpretation, his statement contributed nothing.

**FAA Administrator Quesada**—*Laxity on the flight deck and in airline maintenance calls for a vigorous FAA enforcement program.* Quesada blasted irresponsible attacks by special interest groups, indirectly accused pilot leaders of damage to the cause of public safety through intimidation and pressure against FAA crackdowns. His promise: a tougher safety enforcement beyond levels now termed "harassment" by pilot groups.

**Stuart G. Tipton (ATA)**—Virtually an across-the-board endorsement of FAA and Quesada as "constructive, aggressive, fast-moving and firm" with only a plea for more full and free discussion of air safety proposals.

**C. N. Sayen (ALPA)**—*FAA over-reliance on the "book" coupled with lack of proper qualifications of FAA inspectors (who are "throwing" it at pilots) is not helping air safety.* Sayen produced "real live" pilots and a case history at the hearing to prove his point. His plea: improved terminal area nav aids and lighting; pilot training rather than regimentation; an effective near-miss reporting system, and a point of appeal (CAB) from FAA's czarism over aviation. His rebuttal: pilots will not be intimidated from making proper criticisms of public officials and their actions.

## Who's Now Who in the U.K.

British transport manufacturing industry figured heavily in the recent mass-merger program shaped by new aviation minister Duncan Sandys. Here's the final line-up of firms and aircraft:

**Hawker Siddeley-Blackburn Aircraft-deHavilland-Folland Aircraft Group** Companies include Avro (A. V. Roe); Sir W. G. Armstrong Whitworth Aircraft; Blackburn Aircraft; Bristol-Siddeley Engines; deHavilland Aircraft; deHavilland Engines; deHavilland Propellers; Folland Aircraft; Gloster Aircraft and Hawker Aircraft. Transports: Armstrong Whitworth Argosy freighter; Avro 748 feeder-liner; deHavilland Comet jets; Airco deHavilland DH-121 medium jet.

**English Electric-Vickers-Bristol Group** Includes English Electric Aviation; Vickers-Armstrongs Aircraft and Bristol Aircraft, possibly Hunting Aircraft. Transports: Vickers Viscounts, Vanguard and VC-10 jet, also projected VC-11 medium jet.

**Westland Aircraft-Saunders Roe Group** Includes Westland, Saunders Roe, the helicopter division of Bristol Aeroplane Co. and possibly Fairey Aviation's helicopter activities. Helicopters: Whirlwind, Wessex, Widgeon, Westminster; Saunders Roe Hovercraft; Bristol Sycamore and Model 192; also Gnome Whirlwind; Wessex Mark 2; Wiltshire WS-61.

**Independent:** Rolls-Royce and D. Napier & Son, Ltd. Also Short Bros. and Harland; Handley Page and Scottish Aviation.

## ATA Formula Due for Change

Air Transport Assn.'s "Standard Method of Estimating Direct Operating Costs of Transport Airplanes," more commonly known as the 1955 ATA Formula, will soon be bearing a 1960 date stamp. Proposed changes have been circulated to airlines and manufacturers for response by Feb. 8.

Barring comments that might necessitate a special meeting, ATA engineering director Allen Dallas expects the new document to be off the press within two months. In circulating the proposal, Dallas paid particular tribute to Lockheed Aircraft Corp. whose report SLR/1800 was used as a starting point for development of the proposed changes.

## An Altimeter Absolved

Almost a full year after the approach mishap of an American Airlines' Electra at New York's LaGuardia Field, FAA recently removed restrictions placed on operation of turbine aircraft with Kollsman Instrument Corp.'s altimeter giving the drum-pointer gauge a clean bill of health. A week later, CAB blamed an accumulation of factors, mostly dealing with pilot technique, possible crew misinterpretations and illusions as the probable cause of the accident.

The Board's report sidestepped what most pilots are convinced was the underlying contributor: FAA negligence in providing proper approach lighting at what they consider one of the toughest approaches to one of the busiest airports in the U.S. Air Line Pilots Assn., continuing its investigation of the accident, termed the CAB findings "grossly inaccurate."

## Vortac Vs. Decca: Round 2

The irresistible forces and immovable objects that represent the proponents of both the U.S. and British short-range nav aid systems flared into open debate again recently as FAA virtually denounced Britain's Decca as unsuitable and Decca officials counter-denounced FAA's harassing press notice.

Apparently intent on curbing U.K. inroads to gain additional Decca supporters, FAA announced that the British system did not meet its needs for a primary IFR nav aid, failed to provide the needed information on 61% of test flights and said its controls were relatively cumbersome on 22% of flights.

Lashing back at FAA, the Decca Navigator Co. Ltd. said the comments do not stand up to even superficial examination, expressed surprise that FAA would release such a statement when the report on which it is based is not yet available.

The outlook: an ever widening instead of narrowing gap between the U.S. and U.K. on this important (and potentially very expensive) problem.

## New on the Order Books

**SALES: Hawaiian Airlines:** option for lease-purchase of Douglas' No. 1 DC-8, now being converted for JT3D certification. Carrier hopes to order two more DC-8s, maybe six. Orders hinge on award of route in trans-pacific case. **Western Air Lines:** three Electras, bringing

*More news on page 18*





total to 12. Delivery: July/August. **Alitalia:** two more DC-8s, for total of six. First deliveries begin in 1961. **Lufthansa:** four Boeing 720s, delivery in 1961. **Pacific Air Lines** will purchase eight Martin 4-0-4s from TWA if CAB will guarantee \$469,000 Bank of America loan. **U.S. Army:** 24 de Havilland Caribou light cargo planes, budgeted for FY 1961. Eventual order may total 500. **Allegheny:** 11 Convair 340/440s from Lockheed and five 540s from Napier Engines, Inc., including aircraft now on lease. **Japan Air Lines:** fifth DC-8, by May, 1961. First delivery scheduled for June 1, 1960. **Capital Airlines:** option to purchase the 11 DC-6Bs it will lease from Pan American. **Alaska Airlines** is considering purchase of Electra, Britannia, Boeing 720, Convair 880 or Comet 4C; has retained Colin McIntosh, Washington, D.C. consultant, to evaluate equipment needs. Decision will come before Mar. 31. **Trans Australian Airlines** is seeking government permission to import third Electra in equipment race with Ansett-ANA. **Chicago Helicopter Airways:** two Sikorsky S-58s, bringing total to eight. One will be delivered this month, one next. **General Electric:** one Caravelle, delivery July 14, 1960. Aircraft will be used for testing G.E.'s CJ-805-23 aft-fan engines. **Misrair, S.A.E.:** three Comet 4Cs with Avon engines, delivery date unannounced. **U.S.A.F.:** 35 more Sabreliners, bringing current total to 42. First aircraft to be delivered this year. **Lake Central:** order for five with option for 10 Allison Super Convaers, first delivery late this summer. Conversion to LCA 52-passenger payout will be handled by Pac Aero Engineering Corp., subsidiary of Pacific Airmotive Corp. **New York Airways:** 10 Vertol 107 25-passenger turbine helicopters, delivery between spring of '61 and late '63. Powerplants are two GE CT58s rated at 1,250 shp for takeoff. Cost: about \$9 million. **CONVERSIONS:** Two **Qantas Airways'** Lockheed Super Constellations to convertible cargo-passenger layout, by Lockheed Aircraft Service, Ontario, Calif. **LEASE: Mackey Airlines:** a DC-6 80-passenger coach, \$10,000/mo., option to lease two more; **Delta:** one DC-6, \$12,500/mo.; from Frederick B. Ayer & Associates. To date, Ayer has sold or leased 18 of 30 American Airlines 240s, five of 45 DC-6/6Bs.

## Briefs

**Rolls-Royce RB-141,** 15,000 lb. thrust fan being proposed for the Caravelle Mark VIII, has completed its first run on testbed at Derby. Allison Division, G.M. is weighing U.S. license production of the R-R fan, a factor that may expedite availability of the Caravelle VIII.

**FAA Statistical Handbook of Aviation,** 1959, now available through Govt. Printing Office, Washington 25, D.C. Price: 60¢.

**Directors of Boeing** and Vertol have announced plan whereby Boeing would acquire the VTOL manufacturer. Vertol shareholders will vote Feb. 15 on the proposal, which will become effective March 31 if approved.

**Latest Rolls-Royce Conway,** the R.Co. 42, will give 20-, 250 lbs. guaranteed minimum thrust. This is version specified for 35 Vickers VC-10s on order by BOAC.

**Warren E. Alberts** has been elected VP and assistant to the president of United Air Lines. He was VP-industrial engineering since 1958.

**Aircraft seat manufacturer, TECO, Inc.** is building R&D center for general airline seat research functions. Setup will include space for full scale cabin mockups.

**Lone Star Airlines, Inc.** is new operator to offer Dallas-Houston service starting Feb. 28. Service will be 12 daily

nonstop flights, with Martin 2-0-2s in 44-seat configuration. Lone Star manager is Stewart Faulkner, 13-year PR veteran of Continental Airlines. President and organizer is David M. Segal, Denver radio station and motel owner. Only CAB-certified competitor on Lone Star's route is Braniff.

**Used aircraft sales** of \$18,100,000 were reported for 1959 by William C. Wold Associates, double 1958's record. Big volume is expected in 1960 as airlines get volume deliveries of turbine aircraft.

**A Flying Tiger headquarters** shuffle from Burbank to Los Angeles International is in the works. FTL president Robert W. Prescott says Burbank's runways will not accommodate CL-44Ds which the cargo carrier expects to receive early next year.

**Chase Manhattan Bank** has dropped its bid for CAB guarantee on \$3,100,000 loan to Mohawk Airlines for purchase of Convair 440 aircraft. Bank attributed move to increase in carrier's equity plus boost in manufacturer support.

**North Central Airlines** will ask for CAB loan guarantee to buy five more Convair 340s. Carrier hopes to start operating the aircraft May 1.

**United Aircraft Corp.** and SNECMA have come to terms on licensing and stock acquisition. SNECMA will manufacture and sell P&W J57, J75, JT3D-3, JT12A and JTF10-A jet engines and full line of piston engines and spare parts. UAC gets 10.9% interest in French firm.

**Western Air Lines** has CAB approval to lease 45 propellers from Al-West Leasing Corp., a GM subsidiary, for \$21,240 to \$23,600 each.

**Aloha Airlines** has requested a CAB loan guarantee for three F-27s, spare engines, radio and navigational equipment and spare parts. Purchase would bring carrier's F-27 fleet to six.

**After four months** of manually flying the big jet, DC-8 pilots can now go on autopilot. Sperry's SP-30, which had been installed but deactivated, now has FAA approval. Last July, Douglas decided to proceed with DC-8 certification less the autopilot in order to meet a stepped up introduction schedule.

**Dallas' Love Field's** moving sidewalk was ordered to a halt by aviation director George Coker, pending safety investigation in death of two-year old girl.

**Hayes Aircraft Co.** has taken over base operations and services at Birmingham Municipal airport. Former operator was Central Aviation Co., whose lease had expired. New manager is Paul Mittendorf.

**Horton & Horton,** until now specialists in custom aircraft interiors, launched Inter-America Aviation Modification Center at Ft. Worth's Meacham Field. New aircraft maintenance, modification and overhaul activity will tie in associated services of Dallas Airmotive, Airline Instruments, Associated Radio and Flight Proficiency, Inc.

**Link Aviation, Inc.** emerged victorious in four-year old lawsuit by Curtiss-Wright for alleged patent infringement in flight simulation.

**Air Transport Assn.** retained as noise abatement consultant retired Marine Brig. Gen. Jack R. Cram, FAA deputy chief of airspace utilization.

**In one of the rare instances** of open conflict between air transport sellers and buyers, National Airlines asked an impartial Los Angeles arbitration panel to require Douglas Aircraft to return \$250,000 being held as cancellation charge on three DC-8s. NAL charged Douglas actually canceled the three jets, had already sold them (and two others) to Northwest.

*Portraits  
of*  
PERFORMANCE



Two rousing tributes to the performance reliability of CECO products are the remarkable records being compiled by the jet airliners pictured above in "gallery display"—the Boeing 707 and Douglas DC-8.

*Main fuel pumps* for the Pratt & Whitney Aircraft engines powering each were engineered and precision-produced by Chandler Evans. Significantly, during the first exciting year of U.S. commercial jet operation, CECO pumps took part in every single service mile flown by either type of aircraft.

If pictures of missiles and aircraft which are airborne with CECO products actually *were* exhibited in a gallery, the section devoted to pump applications would be an impressive one. In addition, space would have to be set aside for future portraits, since right now . . . at Chandler Evans . . . a number of important pump design and development programs are underway.



**CHANDLER EVANS CORPORATION**  
West Hartford 1, Connecticut

*Interesting, informative literature on many CECO products is yours for the asking. Please address your request to Dept. 10.*





## Where a Texaco Engineer hangs his hat

When TWA signed with Texaco for the major portion of their domestic jet fuel, they knew they were also getting Texaco on-the-spot service—and all-important *quality protection* of a critical product.

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AND FUELS

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AIRLIFT

# Will Red Tape Strangle Mergers?

**A** NEW WAVE of airline mergers? The basic economics of the jet age say "yes". But the facts of life indicate it will be a mere ripple—mostly conversation.

Airline officials that may consider the necessity for, or advantages of, sound mergers are usually quickly discouraged for a variety of reasons. Among them:

- signing of a merger agreement can be corporate suicide if government approval is not gained in a reasonable time;
- existing government machinery presents a formidable obstacle to smooth consummation of merger agreements;
- the spark necessary from above such as was struck by the Civil Aeronautics Board in the last big merger wave, just doesn't seem to be there in 1960.

Take, for example, 1949. Under the chairmanship of Joseph J. O'Connell, CAB issued a unique statement of policy which, among other things, suggested strongly the need for certain airline mergers. CAB hasn't the power to compel mergers directly and the statement was not a directive as such. Yet it was one of the pushes that brought about the last wave of mergers which reduced the domestic trunkline industry from 16 to 12 companies.

In the 1950-52 period, when CAB was headed by Delos W. Rentzel and later, Donald W. Nyrop, some interesting internal merger studies were prepared, although never publicized. Here are some of the principles developed in those studies which were reflected in Board thinking at the time:

- It should be the policy of the Board to favor all mergers and route transfers which will reduce the unit cost of providing air transportation (certain conditions were suggested to guard against the largest carriers getting larger through merger).
  - Encouragement should be given to merger proposals.
  - The Board should seek statutory authority to compel desirable mergers, though voluntary mergers are preferred.
- Although it had several staff suggestions for actual mergers at that time, CAB never got around to forcing its will. Because it lacked the power to compel mergers it never publicized those suggestions.

Nevertheless, CAB was obviously merger conscious. Not the last reason for its attitude was a freely-admitted desire (concurrent in by the industry) to achieve self-sufficient (non-subsidized) status for all carriers. The "Big Four" was then off subsidy; the problem, as CAB saw it, was with the remaining 12 regional trunks.

It is not insignificant that a wave of mergers was inspired and that the trunk industry has achieved self-sufficiency. But the physical process of effecting those mergers was not as smooth as the theories that helped produce them.

First, the companies learned that once a merger agreement was reached a serious employee morale problem set in. This issue alone was sufficient to compel quick consummation of the deal. But there were other factors. A progress *statu quo* sets in when a merger agreement is reached and this is not usually erased until the actual merger has taken place. Also, minority stockholders, given enough time, can usually whip up enough opposition to void the agreement

or, at least, make it distasteful. Meanwhile, competitors are not standing still.

A review of merger cases before CAB since 1938 shows that it takes an average of eleven months to secure a CAB ruling (see table). It usually takes an extra three to five months to gain a CAB order transferring certificates of the absorbed airline.

Even if the review is confined to mergers since 1950—during the period when CAB was actively encouraging mergers and granting "expeditious treatment" to merger agreement applications—there is little change in the average time—10.8 months for a tentative decision, three to five months for a final order.

The fastest merger case on record, that involving Braniff Airways and Mid-Continent Airlines in 1952, took four months from date of filing with CAB to date of tentative CAB approval. Another three months was required before physical transfer of MCA's certificates to Braniff was accomplished by CAB.

If measured against the "speed" of some other types of CAB cases which run for years, mergers can be regarded as models of expediency. But considering that merging companies are literally suspended in mid-air in an industry moving as fast as air transport, even four to seven months can be too long, indeed, perhaps fatal.

Even if the present CAB should suddenly get merger conscious, encourage companies to merge, and handle these moves "expeditiously", it is doubtful if the old merger cases could be speeded up. Furthermore, there are no visible indications that CAB feels mergers will be necessary.

A great many airline officials today predict the necessity of airline mergers, but they carefully add that *their* companies will not be involved. The economic ice at this stage of the jet age is too thin to risk the hazards of a merger experience that could drag out for a year or longer.

Yet, jet economics will become more and more vital as jet fleets expand. Conceivably, this could inspire CAB to adopt policies reminiscent to those a decade ago. In view of this, it would seem more than appropriate for CAB, Congress, and the industry to review the cumbersome merger machinery now. The jet age will not wait for delays.

**TIMETABLE ON CAB MERGER CASES**

	Filed	Decision*	Approved	Time
United-Western .....	7- 6-39	6-19-40	No	11½ months
Western-Inland .....	10-16-43	5-23-44	Yes	7 months
NAL-Caribair .....	6- 4-45	3- 1-46	No	9 months
America-Mid Continent .....	10- 1-45	9-26-46	No	12 months
Pan Am-AOA .....	12-15-48	7-10-50	Yes	19 months
West Coast-Southwest .....	4-10-50	8- 7-51	No	16 months
West Coast-Empire .....	12-10-51	4-27-52	Yes	7½ months
Braniff-Mid Cont. ....	1-24-52	5-26-52	Yes	4 months
Delta-CAS .....	4-28-52	12-24-52	Yes	8 months
Eastern-Colonial .....	7-24-52	2-26-54	No	19 months
(1st Agreement)				
Flying Tiger-Slick .....	3-26-53	1- 7-54	Yes†	9½ months
Continental-Pioneer .....	12-11-53	12- 7-54	Yes	12 months
Eastern-Colonial .....	2- 3-55	1-11-56	Yes	11 months
(2nd Agreement)				

\* The date of CAB decision shown is that of the first decisive ruling by the Board. † Although FTL-Slick merger was approved, merger was not consummated.



## A Pre-Service Preview

# Convair's 880 is Ready to Go ... Fast

By WILLIAM J. COUGHLIN

SAN DIEGO—"This thing is a real hotrod!"

Thus Convair pilot Phil Prophet, assistant chief engineer in charge of flight test, sums up twelve months of flight testing of Convair's new 880 jet transport, the fastest airliner in the world.

The 880 flight test program is being pushed swiftly to completion with well over 700 of the 900 hours needed to obtain certification now flown.

The newest of the jet transports is meeting or exceeding all its performance estimates and guarantees, including its 615-mph top cruise speed.

Contractual date for certification is May 1, but it seems likely Convair will beat that by a considerable margin. Certification testing of such items as the electrical system, air conditioning and pressurization, anti-icing, communications and navigation systems has been finished.

The three aircraft in the test program now are engaged in certification of basic stability, control and landing and takeoff distances. A fourth aircraft is to enter the test program shortly.

Functional and reliability testing over actual routes is to begin the last week in February. Flying for certification will wind up sometime in March.

Delta Air Lines has its first aircraft for crew training and is to get a second one next month. Hughes Tool Co. already has three TWA aircraft. One TWA 880 is scheduled to join the flight test program, primarily for certification of the TWA communications and navigation systems.

By May 1 TWA is to have 10, Delta 3.

The 880 flight test program has moved rapidly since the first flight in January of last year. In the first two months of testing, 54 hours were piled up on 27 flights which took the aircraft above 40,000 ft., to its maximum speed of Mach .93, up to its maximum gross weight and to its 230-knot maximum low altitude indicated air speed.

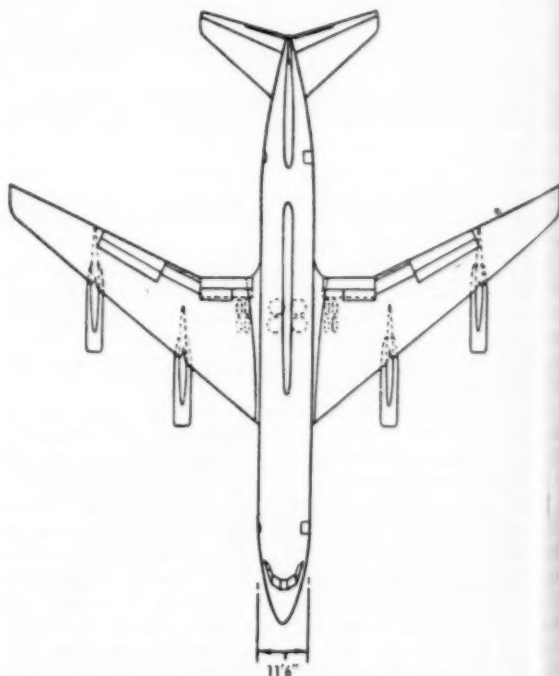
"Covering your total speed-altitude envelope in two months is significant proof of the operational capability of an airplane," Prophet notes.

In addition to its 615-mph cruise speed, the new jet has met or exceeded performance estimates of 3,580-ft./min.

rate of climb (sea level, normal power, takeoff weight); 1,700-gal./hr. fuel consumption (30,000 ft., average cruise power); 6,220-ft. takeoff and 5,460-ft. landing CAR runway distances (sea level, standard conditions, 2,016 statute miles); 113-mph stalling speed (landing configuration at 125,000 lbs.); 40,000-ft. maximum cruise altitude.

Flight test data confirms engineering estimates of range and fuel operating economics not only for the 3,450-statute mile maximum range but also for medium ranges.

"There is no place where we are the least worried about guarantees," says senior project engineer Bernard J. Simons.



Convair credits much of the success of the program to the General Electric CJ805-3 engines around which the 880 was designed. Fuel consumption has equalled or bettered estimates at each of the altitudes for which flight test data has been acquired. Engines have been virtually trouble-free.

Only once has the 880 flight test program run into really serious trouble. That was last March when two-thirds of the big vertical fin ripped away in a Mach .93 dive over Edwards Air Force Base. Flying with the aircraft cocked by asymmetric engine thrust to take fullest advantage of the remaining fin area, test pilot Don Germeraad brought the aircraft down safely on the dry lake bed.

The trouble was largely a result of pushing the testing ahead too rapidly because things were going well. Model and in-flight flutter testing had indicated the rudder was clean and might need no flutter dampers, though these were called for in the design.

#### Sudden failure

The failure when it came was sudden, on the second high-speed dive of the flight, ripping away most of the fin within five seconds. The disaster occurred so swiftly the chase pilot didn't even have time to call out when he saw it start. With a new fin, the aircraft was flown to San Diego two days later.

Static test at about this same time was checking torsion and bending moments of the actual tail against design estimates. The tail proved stiffer than anticipated. The dampers were added.

In airline operation, of course, the aircraft will be speed-limited to Mach .89 but this means testing to Mach .92.

Another failure occurred when both fixed fairing doors on the main landing gear ripped off in flight. Main gear on the 880 is designed to serve as a dive brake and can be dropped at speeds up to 375 knots.

The doors came off as the gear was being dropped, the dynamic loading in the cycle being greater than anticipated. Interesting from the design and materials standpoint was the fact that the chase plane film showed both doors tearing off at precisely the same moment.

Vortex generators have been added both to the wings and vertical fin of the 880 as a result of flight test data. The dozen or so on each wing will serve to prevent an air-flow separation which was resulting in a slight area of aileron insensitivity. Those on the fin are to improve minimum control speed by enabling the pilot to hold more rudder at high sideslip angles. The pressures affected are forward of the hinge line.

"In this case, vortex generators are a significant aerodynamic improvement," grins Prophet. "When someone else uses them, they are a crutch, of course."

Most of the work in the flight test program has been concerned with the 880's mechanical control system, tailoring control surfaces and their balances for satisfactory handling. Minimum control speed forces on the rudder, for example, have been trimmed from 150 lbs. to about 130 lbs.

Prophet, who has also flown the Boeing 707 and Douglas DC-8, predicts airline pilots will find the outstanding handling difference in the 880 due to its improved thrust to weight ratio, which makes it a lively aircraft to fly.

Best climb speed on the 880, for example, is 345 knots compared with 260 to 280 knots for the DC-8 and 707. This is not likely to be a very usable speed, of course, with the present air traffic control system.

Pilots accustomed to the present jet procedure of coming over the boundary line at reference speed plus 10 knots and making use of the final increment of flaps to kill off the 10 knots will have to fly the 880 somewhat differently. Flaps don't produce quite as much drag in the full-flap position on the 880 as they do on the DC-8 and 707. So the increase to full-flap position on the 880 will have to take place further back on the final approach.

Dutch roll characteristics of the 880, according to Prophet, are better than those of the 707, not quite as good as the DC-8.

Nose wheel steering on the 880 is an improvement on both the earlier jets, according to the Convair pilot. He also praises the 880 as having "unquestionably better visibility than either of the others." One feature which will appeal to pilots is location of fuel jettison nozzles well outboard, about six feet from each wingtip.

#### Designed around an engine

The 880 design began to evolve with the development of the General Electric CJ805-3 engine, commercial version of the J-79 military engine which already was destined for the Convair B-58.

"The GE engines were very attractive to us because they were so light," says A. D. Riedler, senior design group aerodynamicist. The CJ805-3 produces 11,200 lbs. of thrust, weighs 2,800 lbs. The first design worked up around the GE engines was a jet competitive with the Lockheed Electra. But the Convair designers found they had to put in more people in order to get the desirable economics.

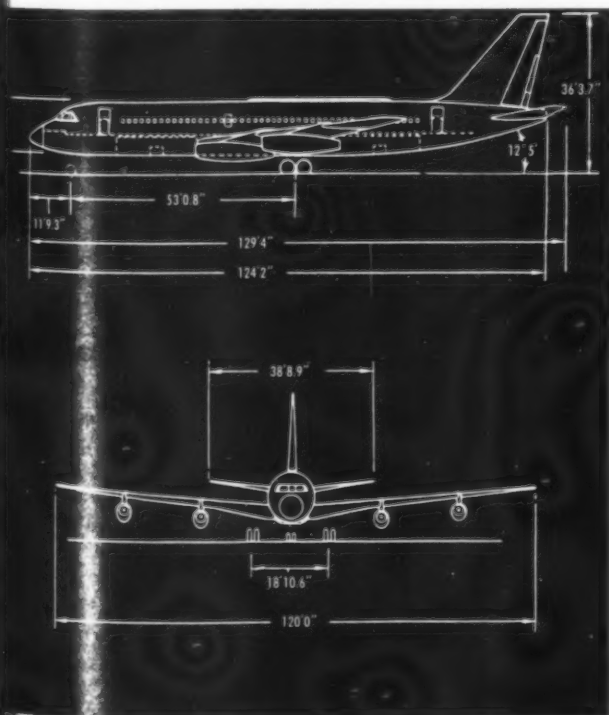
"The wing area has been the same almost from the beginning," says Riedler. "We intentionally put the loading low at the start because you always go up." The 880 has a wing area of 2,000 sq. ft.

Design philosophy called for an airliner that would be the fastest of the jets and one not to be easily leapfrogged in speed by anything short of a supersonic transport.

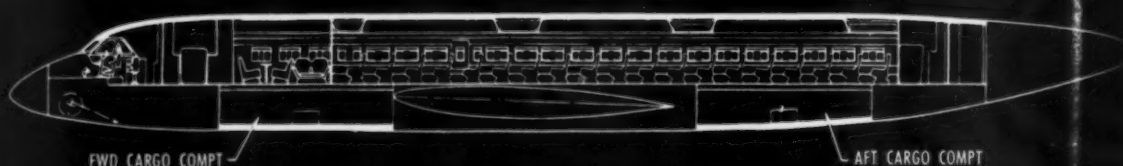
Strong emphasis was placed on keeping weight down. Twice in the design stage, release of all drawings was stopped and design changes were made to save weight. This was done largely by increasing machining and chemical milling.

The Convair designers are quick to acknowledge their debt to the GE engine. "You design an airplane around an engine," Riedler points out.

The basic Convair 880 Model 22 was designed for favor-







able operating costs on flights from 300 miles up to 3,000 miles. Convair expects it to show about 20% lower operating costs on a seat-mile basis than the DC-8 and 707.

"It is a faster, sturdier and less costly airplane than the others, both from the point of initial costs and operating costs," says domestic commercial sales manager Gordon Wolcott. Price tag on the 880 is between \$3.5 and \$3.9-million. Convair expects airplane statute mile cost to be \$1.22 on a 1,500 mile-trip.

Convair cites these schedules under zero wind conditions: Chicago-New York, 1 hr. 25 min.; Los Angeles-Chicago, 3 hr. 5 min.; Los Angeles-New York, 4 hr. 25 min.

The 880 is designed for an average trip length of 500 miles, for a landing once an hour. It can be used transcontinentally, however, which is the way TWA will use it initially.

Since it is not expected to be speed-obsolete for some time, long life is planned into the 880. Under this design philosophy, it is, for example, designed to take at lower stress levels the same number of landing frequencies per year as the Convair 240.

Design was finalized on a medium-range, four-engined jet airliner with a wing swept 35 degrees, carrying 88 passengers in first class configuration—76 in four-across seats and 12 in a salable club area. Other arrangements include mixed seating and an all-coach version with 110 passengers in five-across seating.

The basic 880 has a thin wing, 7% against 9% on the 707. Span is 120 ft.

The control system is mechanical. Ailerons and spoilers are used for lateral control. Ailerons are manually controlled by cables. Spoilers are hydraulically operated and can be used also as speed brakes. Rudder control is provided by a cable-operated flight tab plus a hydraulic boost system active only when some 50 percent or more of maximum rudder deflection is required.

Convair in fact would have preferred a pure power system on the 880 but was unable to sell the airlines.

"Actually, it's turned out better than we expected it to," admits Simons.

#### Wedge-shaped fuselage door

The fuselage door is one of the unusual design features on the 880. This wedge-shaped door has a 9-in. travel up and down a hinge tube. There are no latches. It is entirely outward-opening without the need for any inward movement. Project engineer Simons says the door design permitted a 10-inch saving in fuselage length over other designs considered.

The rubber seal around the door is ported to the cabin interior. This permits the entire cabin to serve as an air reservoir, with the seal blowing up as the cabin is pressurized.

TWA has ordered 30 and Delta 10 of these basic Model 22 880s. In addition, Capital Airlines has ordered seven Model 22Ms. Civil Air Transport (CAT) has ordered one.

The Model 22M, equipped with leading edge slats and

the CJ805-3B engine, will have lower stalling speeds, shorter takeoff and landing distances, a maximum gross takeoff weight of 191,000 lbs., and better specific fuel consumption. It has provision for center section fuel tanks to provide a 3,640-mile range.

The 3B engine will provide 11,650 lbs. takeoff thrust against the 11,200 lbs. of the earlier GE engine.

The Model 22M will be the first commercial airliner to go into service with movable leading edge slats. Designed to improve low-speed handling, the power-actuated slats will extend when flaps are lowered.

The Model 22M is, in fact, an intermediate step between the basic 880 and the larger, swifter Convair 600, which will have a 635-mph cruising speed. A number of airlines switched their orders from 880s to the later 600: Swissair, Scandinavian Airlines System and REAL, which may switch back to 880Ms.

SAS and Swissair have ordered nine aircraft; REAL, three. American Airlines has ordered 25 of the 600s. Current orders total 85 for the 880 and 600 series, with options on an additional 38 aircraft. First 600 is to be delivered in March, 1961, on the joint SAS-Swissair order.

Options include 25 American Airlines 600s, four SAS-Swissair 600s, one REAL 600 and eight Delta 880s.

#### No water injection

Design philosophy behind the General Electric engine which powers the 880 called not only for a small, light-weight engine but one which would operate under all airline needs without any requirement for thrust augmentation at takeoff. The CJ805-3 has no water injection system.

Although it will see airline service for the first time this year, GE has been operating the engine in factory and flight tests for more than three years. One engine has been tested more than 3,000 hrs. including 1,000 hrs. in flight.

The FAA has authorized a sectionalized overhaul of the engine, with an initial overhaul period of 900 hr. for the hot section and 1600 hr. for the cold section. The engine is designed to split for maintenance so the turbine can be removed separately.

GE estimates this increased overhaul time will reduce direct operating costs of each airplane by almost \$80,000 per year as compared with straight overhaul at 900 hrs.

The engine manufacturer also developed the thrust reverser and noise suppressor for the 880.

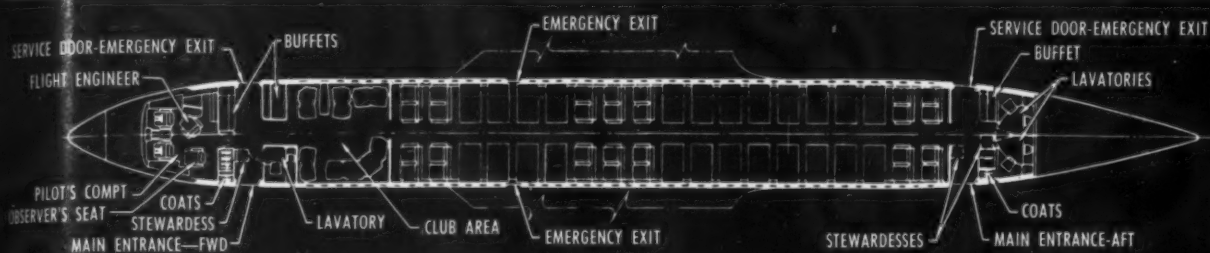
"We believe the suppressor design is the best which has so far been offered," says Neil Burgess, manager of GE's commercial engine program. Noise attenuation is about eight decibels, with a guaranteed performance loss at cruise of less than two percent.

The 880 checked out about four db lower than the 707 and DC-8 on the Port of New York Authority sound tests.

Thrust reverser on the 880 provides a guaranteed reverse thrust of more than 5,000 lbs. per engine.

Feature of the GE engine which should appeal strongly to pilots is its quick acceleration, Prophet points out. Response to the throttle is said to be the same as that of a





reciprocating engine. On a go-around, full takeoff power can be reached in two seconds against five seconds for other commercial jet engines, it is claimed.

"This will become known as the outstanding engine of the decade, in my opinion," says Convair sales manager Wolcott. "This has been by far the best engine we have ever had experience with."

General Electric also developed the electrical system, which has been equally trouble-free in flight test.

This dual system responsibility will have an advantage for the airlines, Burgess points out. "It means one source for these two major systems."

Air-conditioning, pressurization and anti-icing systems were developed by Hamilton Standard. This contract went to Hamilton Standard largely because it was willing to tailor a complete system specifically to the 880 while, according to Convair sources, AiResearch—backed by TWA—wanted to adapt the 707 system to the 880. The Hamilton Standard design resulted in a 100-lb. weight saving. Some early troubles in the flight test program with hydraulic pumps have been solved by beefing up the pump.

Most unusual production technique on the 880 is the use of the Scotchweld process to bond the wings with a special sealant to create integral fuel tanks that are said to be leak-proof, maintenance-free and corrosion-resistant. In more than four years of use, integral wing tanks on the Air Force F-102, sealed by the Scotchweld process, have developed no leaks.

This technique now will be applied to a commercial airliner for the first time. "Scotchweld is going to mean more to the airlines than they can imagine," says Simons. "It's going to mean absolutely trouble-free fuel tanks."

#### Fewer maintenance troubles

Traditionally, wings have been a maintenance trouble spot. Convair expects Scotchweld to change this. Scotchweld has advantages other than sealing. The prime provides a corrosion-resistant coating which is said to be unaffected even by Skydrol. Adhesive bonding of the wing also adds considerable strength, which comes as a bonus since it is not taken into account in design.

The adhesive bonding prevents slippage by sharing the load with the rivets, thereby eliminating enlargement of rivet holes, loosening of rivets and development of fuel seepage leaks, according to Convair. Says Simons, "Scotchweld develops up to 4,000 psi. in shear."

Convair has built a \$750,000 facility for preparing and priming component parts which go into the 880 wing. Also set up was a giant electric oven capable of curing two 880 half wings.

During wing assembly, Scotchweld adhesive film is placed between the skins and fuel-tight bulkheads and spars that form the integral tanks. After assembly, the two half wings are baked in the oven at 320 deg. F. The organic material bonds with the aluminum alloy to form a tough, fuel-resistant seal. The process was developed jointly by Convair and the Minnesota Mining and Manufacturing Co.

The 880 is a sturdy aircraft. Minimum thickness anywhere in the pressure fuselage is 1/16 in., maximum is 1/8 in. Every piece of material in the aircraft which is designed by tension is 24ST, due to its good crack propagation characteristics, according to Simons. Forgings are 14ST. On the upper surfaces designed by compression, 75ST is used.

Thorough water tank testing of fuselage with wing stubs has been carried out, with some resultant beefing of the windshield area.

Production now is scheduled through November, 1961 on present orders. Peak production of six per month will be reached by June.

Convair foresees a bright sales picture for the 880. Frank Pace, Jr., chairman of the parent General Dynamics Corp., says that if present options were taken up, sales will have almost reached the break-even point. Research and development costs for the 880 and 600 jetliners are largely written off already, he says.

Sales manager Wolcott predicts an increasing demand for more medium-range jets in operation beginning in 1962. That means the aircraft will have to be ordered sometime this year. Convair believes the 880 will fill a large part of that demand, a belief brightened by the success of the flight test program.

#### CONVAIR 880 JET AIRLINER

##### Specification Details and Performance Data

Performance	Basic	Intercontinental
Cruising speed	615 mph	615 mph
Range <sup>1</sup>	3450 statute miles	4210 statute miles
Stalling speed	113 mph	106 <sup>2</sup> mph
Maximum cruise altitude	40,000 ft.	40,000 ft.
Rate of climb <sup>3</sup>	3700 fpm	3140 fpm
Fuel consumption <sup>4</sup>	1700 gal./hr.	1700 gal./hr.
Takeoff CAR runway <sup>5</sup>	5200 ft.	5500 ft.
Landing CAR runway <sup>6</sup>	5300 ft.	4930 <sup>7</sup> ft.
<b>Capacities</b>		
Passengers <sup>8</sup>	88	88
Payload <sup>9</sup>	23,150 lbs.	23,150 lbs.
Fuel	10,770 gal.	13,070 gal.
Oil	28 gal.	28 gal.
Cargo capacity	863 cubic ft.	863 cubic ft.
<b>Dimensions</b>		
Overall wing span	120 ft.	120 ft.
Wing area	2000 square ft.	2000 square ft.
Overall length	129 ft., 4 in.	129 ft., 4 in.
Height over tail	36 ft., 4 in.	36 ft., 4 in.
<b>Weights</b>		
Maximum landing gross weight	132,800 lbs.	155,000 lbs.
Maximum takeoff gross weight	184,500 lbs.	203,400 lbs.
Maximum ramp weight	185,000 lbs.	204,000 lbs.
Maximum zero fuel weight	117,000 lbs.	126,000 lbs.

#### Engines

Four General Electric CJ-805-3 jet engines, equipped with silencers and thrust reversers.

<sup>1</sup> Full first-class payload and normal reserves.

<sup>2</sup> Sea level, normal power, takeoff weight.

<sup>3</sup> 30,000 feet, average cruise power.

<sup>4</sup> Sea level standard conditions; 1750-mile trip.

<sup>5</sup> Sea level standard conditions; 1750-mile trip.

<sup>6</sup> Coach version 110.

<sup>7</sup> Coach version 26,780 pounds.

<sup>8</sup> With wing leading edge devices.

# Transcontinental Jet Flight Report

By **KARL M. RUPPENTHAL**

**Here's an inside-the-cockpit report of the problems of flying and operating jet transports, a block-to-block account of two transcontinental flights written exclusively for AIRLIFT by a fully-qualified airline jet pilot.**

**T**HE START LEVERS are scarcely moved into the off position when someone asks the captain how he likes the 707. Is it harder to fly than the pistons? How fast does it *really* cruise? How long can you hold before going to an alternate? Are jets really big money-makers?

These are not simple questions to answer. The jet is a complicated machine. Whether the flights are easy or hard, exhilarating or exhausting, profitable or not will depend upon many factors. Flights vary tremendously. This run-down on two recent flights will illustrate the point.

Ninety minutes before scheduled departure, flight 62's crew began planning the night flight from San Francisco to Baltimore. The flight stops en route at Los Angeles and arrives at Friendship Airport at 7:15 a.m.

Los Angeles weather was borderline, and Ontario looked like a definite alternate. Baltimore reported 5,000 feet and 4 miles, forecast to improve. The plane was at the ramp being serviced by commissary.

The captain saw that a full load was expected at L.A. He checked wind, temperature, and altimeter and asked the second officer to work out a flight plan for the first leg. He called Los Angeles for a payload estimate.

Forecast winds for the second leg indicated an average gain of 60 knots at 31,000 feet with Jet Route 64 to Hill City, Jet 80 to St. Louis, then Jet 8 to Baltimore. En route weather was good with some low-lying stratus. The first officer computed the flight plan for this leg.

The captain looked it over. Then he filed the flight plan and picked up his clearance. The crew boarded. Three pilots checked equipment, and the second officer read the check list. The first officer replaced a dead bulb.

Five minutes before scheduled departure they radioed the tower that the flight would soon be underway. Two minutes later doors were closed and the engines started.

The crew worked in close coordination. By interphone the captain made sure each engine was clear. He operated the start levers while the first officer turned the start switches. The second officer monitored engine instruments. As they taxied from the gate, he read the taxi check list, then copied the ATC clearance.

Near the run-up block, the tower changed the runway. Unexpectedly 28L was closed, and it was necessary to use 19R. The second officer checked the runway charts. He noted the new speed for  $V_1$  and maximum allowable time for take-off roll. He computed the tail wind and decided the flight was legal on the new runway.

The captain verified the figures as they approached the run-up block. Three minutes after leaving the gate the flight was airborne. Fifty minutes later it landed at Los Angeles. Total elapsed time: 58 minutes. Total scheduled time: 1:05.

It was teamwork again out of Los Angeles. The crew gained two minutes by reading the check list while taxiing out. Take-off clearance came before they reached the runway threshold. They were cleared to Ling, at 10,000 feet. Seconds later the flight was airborne.

Over the shoreline ATC changed the routing. The new clearance limit was Pacific, to cross Albacore at 12,000 or higher, maintain 15. The second officer verified the new radials. The captain changed course.

Half an hour later they approached the Colorado river. Upper air was smooth; they could see Las Vegas and the lights of Phoenix in the distance. Near Pueblo the captain recomputed his fuel. At this altitude he could cruise four hours more at mach .82. He could fly non-stop to Gander! The short taxi time in L.A. had consumed but 600 pounds—slightly more than half of the 1,000 pounds allowed. Taxi fuel saved might not go far to keep the baby aloft, but it did mean important dollars saved.

## Change about

Over Hill City the captain checked the cabin. The first officer slipped into the captain's seat, the second officer sat on his right. Both men were qualified for the job they temporarily assumed.

Satisfied that all was well in the rear, the captain returned to his seat. Two hours later he cut the engines at Baltimore. He felt tired but good.

Close teamwork between ground personnel, flight crew and ATC had saved 15 minutes—enough time for the jet to fly 50,000 additional passenger miles with an increased revenue potential of \$2,000. That's the kind of operation that makes the balance sheet look good.

Let's assume that all jet flights are uneventful, let's look at one from New York. Flight 45 departs Idlewild at 9:30 a.m., a popular hour for a San Francisco non-stop. Two competing flights leave about the same time.

Ready on time, the plane was towed to the starting area. At New York, many flights must be towed from the gate because of Port Authority restrictions. The crew started the engines, but the plane could not move. A jet with starter trouble blocked the way. The strip is too narrow to turn around, and there was nothing to do but wait. Four minutes were lost, and 400 pounds of fuel.

A company memo reminds pilots that nearby communities object to jet noise. It asks them to use runway 25L if at all practical. Nevertheless, ground control cleared the flight to 31L.

The pilot asked about noise abatement; the controller replied that he worked for the FAA, not the Port Authority. He said he would authorize 25L at the pilot's request, but that it would entail some delay. The captain rechecked the cross wind, requested the noise abatement runway, and hoped for minimum delay.

At the end of the runway the jet was stalled again. Blocking the runway was another flight whose clearance had not

come through. Two minutes were lost. Eventually the flight was airborne. Unnecessary ground delays: 8 minutes. Unnecessary fuel consumed: 800 pounds. Still pretty lucky, thought the pilot. Some jets have been delayed so long on the ground at New York they have had to return to the ramp for more fuel.

Flight 45 got its requested route but not its desired altitude. The jet with starter trouble got "magic 310," the altitude most flights desire. Assigned flight level 290, the captain recomputed his fuel. He could make his destination if the headwinds grew no worse, and if the temperature held the same.

Three flights behind him also requested flight level 310. "Unable," replied ATC, "I'll relay your request to Cleveland."

As 45 climbed through 24,000 feet, New York Center passed control to Silverstone, the high altitude jet radar control for that area. The flight was identified by transponder code and proceeded on course.

Near Cleveland, radar reported a fast moving target 12 miles at 11 o'clock, apparently moving east. Three pilots glued their eyes to the windows. One of them spotted a military jet. It whooshed by, several thousand feet above.

"You're clear now," said Silverstone. "He's eastbound right behind you now." "A hell of a lot of good that information is to us now," remarked the captain. "It was the difference in altitude that saved us, not the radar."

Moments later, radar called again, "Fast moving target 12 o'clock, about 10 miles, altitude and direction unknown. Just showed up on the scope. Do you want a vector around him?" "Don't see him," called the captain. "Give us a vector, please."

"Just a minute," replied the radar operator. "I've lost him on the scope. Have to wait until it makes another sweep. There he is. Turn immediately 30 degrees right. Never mind, he's past you now. Did you notice his altitude as he passed you?"

The captain swore under his breath. Damn the radar, he thought. Sometimes it's off the air. Sometimes it misses the planes. And over the radar sites are dead spots where the installation is almost useless.

Sometimes warnings come so late that a jet couldn't change course in time to miss oncoming traffic. Several near collisions have been averted because the second officer spotted a plane that was out of the captain's line of vision.

An hour later, ATC advised that a military block extending from Joliet to Hill City included all altitudes above flight level 270. Flight 45 was cleared to descend 4,000 feet. The temperature increased, and the captain recomputed fuel. Not enough to make it at this altitude and consumption. He checked his charts and reset power for long range cruise. At that consumption they could make it by dipping into the company's reserve fuel.

For the next 200 miles the winds went wild. Forecast to be 40 knots from the north, they were 80 on the nose. If they continued long, it would be Las Vegas for fuel.

West of Hill City he tried again. With most traffic landing at Denver, he got magic 310. Recomputing his fuel,

he calculated that at this altitude he could make it, provided nothing else went wrong.

At Hanksville he checked again. Headwinds had died down, temperature dropped. If he stayed high to Modesto, he could make San Francisco with about 8,000 pounds in the tanks. Not very comfortable, but the weather was good.

At Modesto he pulled everything off, descended 4,000 feet per minute. Nicely sequenced, he landed straight in. Total delay beyond the airline's control: 20 minutes. Fuel unnecessarily consumed: 5,000 pounds.

The first months of the jets were little short of remarkable. Early flights had capacity loads. There was little traffic congestion. With only a handful of jets in the U.S., airport delays were almost unknown.

Today the picture has changed. Tower operators show little excitement when told that a jet flight will soon be ready to start its engines. Instead of being the only jet to depart, it is one of half a dozen.

### No adequate airports

The fact is that a year after the beginning of jet operations, there is not a commercial airport in the U.S. adequate for jet operations. Only a handful have a runway long enough to permit take-off at certified gross weight. Not one has adequate ramp, start up, and taxi facilities.

It is standard procedure for airlines to allow an extra 500 pounds of fuel for taxi delays at Idlewild. Consideration is being given to extra taxi fuel at other airports.

It isn't the price of this kerosene which bothers the airlines, it is the potentially productive time lost in the delays. Every hour a 707 is in the air it has a potential earning capacity of \$2,000. Every minute's delay costs up to \$50 in crew salaries, maintenance costs, depreciation and lost earnings, to say nothing of passenger inconvenience.

In the air there are also problems. The number of jet airways has increased considerably since the advent of commercial jets, but they are still woefully inadequate. Every altitude above flight level 350 (35,000 feet with altimeter setting 29.92) is preempted by the military. Jet airways begin above 24,000 feet.

Since the western half of the U.S. has inadequate radar service, commercial flights cannot go above flight level 310. Frequently only three altitudes are practical. If the optimum altitude is occupied, a jet may be unable to reach its destination without a supplementary fuel stop.

Jets have voracious appetites at low levels. From New York to San Francisco, at -40°C, the 707 will consume 70,000 pounds of fuel at a constant pressure altitude of 31,000 feet. But if this altitude is not available, and the flight must cruise at flight level 210, fuel consumption will increase a thousand pounds, provided the temperature stays down. If it rises 10 degrees, consumption will increase another 3,000 pounds.

In October, the president of one of the major airlines estimated at least 50% of his flights were unable to get their optimum altitude. He estimated that this congestion cost them \$485 per jet flight. Undoubtedly, the figure is much higher today. Jets are being built faster than airways.

Total cost of an en route stop for a non-stop transcontinental flight may run as high as \$2,000. An hour of potential utilization may be needlessly wasted.

Furthermore, if the flight makes its fuel stop at Denver, it may be unable to take off. In the heat of the summer with Denver's temperature above a hundred, some 707's cannot take off with any pay load at all!

Passenger satisfaction and operating costs are both related to delays and reroutings encountered in flight. When new, nearly all jet flights were full. Passengers eager to try the jets were tolerant of delays. Now, with plenty of jet seats available, load factors no longer reach the high nineties. Cost control becomes imperative and delays expensive.



*Karl M. Ruppenthal, jet-qualified captain for Trans World Airlines, in his off hours also directs the transportation management program at Stanford Univ. School of Business and is a national panel member, American Arbitration Assn.*



# Where Air Union Stands Today

**S**LOWLY BUT INEVITABLY Air Union is taking shape. No one familiar with the individualistic nature of the five founders—Air France, Alitalia, Lufthansa, Sabena and TAI—expected rapid results. Nonetheless, the partnership is now starting to take shape.

The traveling public is already conscious of efforts to coordinate operations on one key route, that linking Europe with South-East Asia. Since the beginning of November, Air France, Alitalia, Lufthansa and TAI have coordinated schedules on this route and have set up joint offices in six cities: Karachi, Bombay, New Delhi, Calcutta, Rangoon and Bangkok.

As for freight, cooperation between Lufthansa and Sabena enables a DC-6A to fly an all-cargo schedule between Germany, Belgium and New York, satisfying traffic requirements of both the Belgian and German airlines. The flight is number LH 245 from Frankfurt to Brussels and SN 245 from Brussels to New York.

During 1960 more joint action along these lines will take place between Air Union member airlines. Discussions have been held on coordination of jet schedules this summer to help carriers threatened by U.S. competition.

One concern Rome which, linked by direct jet flights to New York by both PAA and TWA, would be given a one-plane connection to New York by Sabena. Sabena would fly a Rome-Brussels Boeing 707 schedule connecting (same aircraft, different flight number) with a Brussels-New York schedule.

It won't be until the '60/'61 timetable comes into effect, however, that there will be full coordination of schedules. Then, also, will begin an arrangement whereby the revenues of participating Air Union companies will be pooled and distributed in proportion to ton-miles offered.

Before November, much must be settled with regard to the structure of Air Union. If the partnership is to be-

come a consortium on the lines of SAS (which has almost completely integrated the Danish, Norwegian and Swedish airlines) legislation will be required in Belgium, France, Germany and Italy with the likelihood that Air Union will become a political football in the process.

Increasingly it appears that the future of Air Union is in the hands of politicians in the four countries concerned. Until they have decided how close a partnership Air Union should be (and several observers are worried about anti-trust actions if it is too close) the future is uncertain.

At the moment, Air Union is mainly active in traffic and sales, although there is some consultation between members on purchase of new equipment. The SAS-Swissair partnership, on the other hand, is based on technical cooperation and is being extended into marketing areas. Cooperation between British Commonwealth airlines (BOAC, Air-India International, Qantas and TCA) is more on the Air Union line with accent on pooling of services and coordination of schedules.

Several large international airlines (including one U.S. carrier) have given serious thought to joining Air Union or the SAS-Swissair group but so far no positive action has been taken. KLM, which pulled out of Air Union negotiations before the organization was formally established, recently negotiated with the SAS-Swissair group, officially on matters of mutual interest affecting DC-8 operation and maintenance, but really covering a much wider field of cooperation.

Japan Air Lines has also been talking to the SAS-Swissair people. Discussions among Arab League airlines for the formation of Air Arab that took place in Beirut and Cairo last year reportedly made considerable progress. BEA and Olympic recently signed a consortium agreement. And, in the communist world, there have been signs of increasing cooperation among Eastern European airlines.

## How Airfreight Fared in '59

**A**IRFREIGHT HAD its biggest year in 1959. The record will be broken again in 1960.

The 1959 ton-mile increase of 93.9 million was by far the biggest in airline history. So was the \$10.4 million revenue gain by the domestic trunks.

With conversion of more piston aircraft to freighters as turbines took over passenger business, lack of airline strikes, bigger sales pushes by most carriers, and recovery of the economy from the 1958 recession, the U.S. airlines—domestic, international, local service, all-cargo, and Alaskan—performed 595.4 million freight ton-miles, up 18.7% over 1958. Only in 1955 was the percentage increase larger (22.8%). This involved ton-mile jump of 71.3 million.

**Prediction for 1960**, domestic: 17½% gain. International may be larger. Pan American, for example, is shooting for a 35% increase. International Air Transport Assn's forecast is 1,249,380,000 ton-miles for free world airlines.

Here's how some of the larger lines did last year:

**American:** 103,231,000 freight ton-miles, up 10%, the first time a domestic airline topped 100 million in scheduled service. Air express registered 10,506,000 ton-miles, up

9%; air mail, 20,130,000, up 11%; first-class mail, 2,559,000, up 9%. Total cargo ton-miles (freight, express, mail): 136,426,000.

**Pan American:** 116 million commercial cargo ton-miles (not including mail), up 15%—the second year PAA has topped 100 million.

**United:** 74.8 million freight ton-miles, up 10%; 11.9 million express, up 8%; 28.7 million air mail, down .01%; 4 million first-class mail, down 1.9%. Total cargo ton-miles: 119.4 million.

**TWA domestic:** 32,213,000 freight ton-miles, up 24% 8,934,000 express, up 27%; 17,589,000 air and first-class mail, up 7. Total: 58,736,000. **International,** 11,160,000 cargo, up 47%; 12,698,000 mail, up 0.3%.

**Eastern** (totals in pounds, not ton-miles): 44,501,982 freight lbs., up 31.4%; express, 31,171,546, up 29.1%; air mail, 35,525,881, up 25.9%; first-class, 5,845,199 up 30.2%. EAL says revenue from these items gained 27.3%.

**The Flying Tiger Line:** 88,309,265 ton-miles of domestic commercial freight, including 433,717 ton-miles of off-line charter.





## The new Boeing 720 offers airlines the lowest seat-mile cost of any jetliner

The newest jetliner in the world—the Boeing 720—is pictured above during a recent test flight. Delivery of the first 720 is scheduled for this spring. To date, forty-six Boeing 720s have been ordered by leading world airlines.

The new 720 is designed to operate efficiently and profitably over short-to-medium range routes. The 720 cruises at speeds in excess of 600 miles an hour, and has the lowest seat-mile cost of any jetliner. In addition, the 720 can operate more

economically from shorter fields than any other jetliner. Seating capacity ranges from 80 to 150 passengers, allowing airlines unusual flexibility in seating arrangements.

As demonstrated by Boeing jets already in service, the 720 will bring airlines unprecedented passenger appeal and high daily utilization.

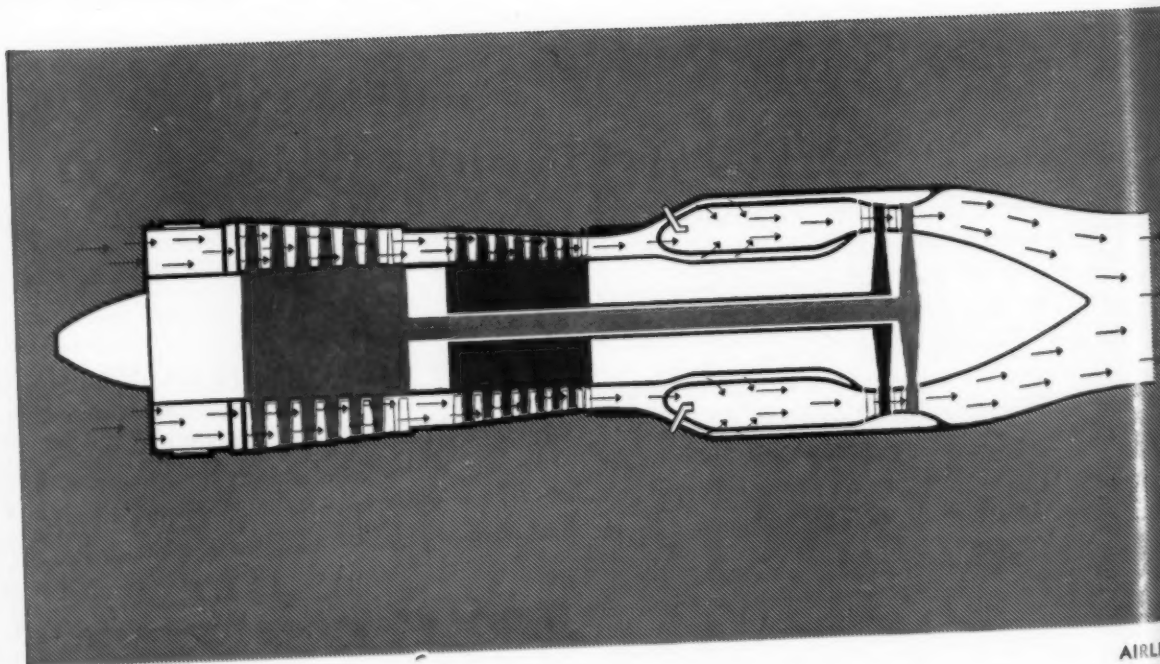
Boeing 707 jets have already flown more than 60,000,000 miles in scheduled operations and have carried more than 2,000,000 passengers.

### **BOEING 720**

Olympus turbojet – high power, low fuel consumption performance

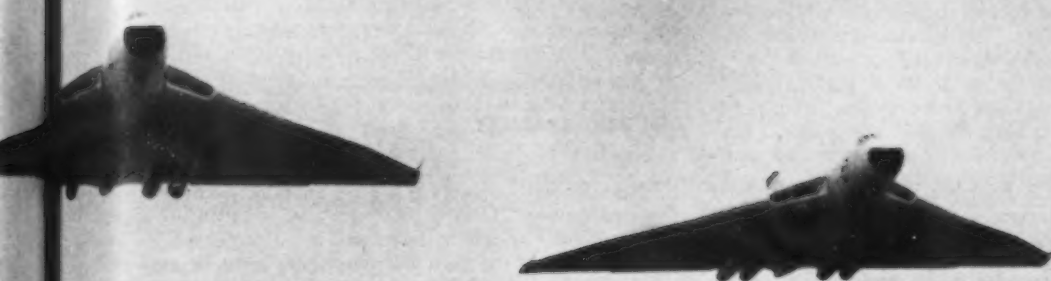


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## ADVANCE BY BRISTOL SIDDELEY

One of the largest manufacturers of motive power units in the world, Bristol Siddeley Engines Limited produce the Olympus. The Olympus is one of the most powerful and efficient high-thrust turbojets in service anywhere and therefore most performance details are security restricted. It can be said, however, that the Olympus possesses outstanding handling qualities. In a slam acceleration to full power from ground idling it considerably better the official requirement. It also has one of the lowest specific fuel consumptions, and the highest thrust/weight ratio of any type-tested aero-engine in its class.

The Olympus owes its excellent all-round performance to the two-spool compressor system, pioneered by Bristol Siddeley and since adopted by the leading aero-engine producers in Britain and the USA. Proof of Olympus reliability is given by the fact that it already has the longest overhaul life of any British fighter or bomber

powerplant. And the series has been proved to have enormous development potential. The first production version delivered 11,000-lb thrust dry, while the current engine reaches 17,000-lb thrust dry (24,000 lb with fully variable reheat). Even more advanced Olympus versions are rated at 33,000 lb with reheat.

### Olympus applications

The Bristol Siddeley Olympus is ideally suited to operation at transonic and supersonic speeds. The Mark 201 gives the Avro Vulcan B2 V-bomber an all-round performance unsurpassed by any other aircraft of its type. The Olympus has also been selected for the very advanced Vickers/English Electric TSR-2, the RAF's new tactical support/reconnaissance aircraft. Other Olympus versions are under active consideration for the next generation of civil airliners—the supersonic transports.



**BRISTOL SIDDELEY ENGINES LIMITED**

Bristol Aero-Industries Limited, 200 International Aviation Building, Montreal 3. Telephone: University 6-5471

## A Reservations Survey

# What's Behind Those Busy Phones?

By ERIC BRAMLEY

**P**ROBABLY THE BIGGEST beef the public has about airline reservations service is that "you can never get an airline on the telephone." It seems you always get a busy signal or the syrupy voice of an operator saying, "reservations are busy, will you wait?" One airline is planning to pipe music into these "held" calls to make the wait more pleasant.

This points up one area of airline sales—telephone reservations—that has more than its share of headaches and unsolved problems. The experts deny that phone service is as bad as some passengers claim. They say they're making improvements, but they're the first to admit that the field is wide open for ideas.

An *AIRLIFT* survey of the domestic trunks (see table) shows that most of them have definite answering standards, and man the phones accordingly (a call is not considered answered when a passenger is asked to wait). But at least one uses no formula and explains why. The survey also shows that the average length of phone call falls within the 2.5 to 3 minute bracket. The larger carriers receive slightly more than two calls per passenger boarded.

Airlines know on what days (mostly Mondays and Fridays) and at what hours big volumes of calls are normally received. One carrier, for example, gets 10-12% of its daily calls in one hour, usually 10 to 11 a.m. Adequate staffs can be planned for these days and hours. But when weather or other circumstances cause unexpected peaks, there's trouble. Peaks are the No. 1 problem.

Typical comment on unpredictable peaks is that of Rex Aber, Braniff's manager of reservations procedures: "When this occurs emergency measures are taken to shift people from less critical activity to telephone sales positions . . . There does not seem to be any painless solution . . ."

Says Robert Leinster, Western's superintendent of reservations service: "Once a passenger and an agent are joined together by a telephone line there is no problem . . . The problem lies in the fact that telephones must be answered and must be answered rapidly during the 'peaks' as well as the 'valleys.' Staffing for peaks is, of course, economically unsound . . . We must speed up and streamline all reservations functions so that not only will each agent be able to handle more calls . . . but more agents within an office will be answering telephones rather than performing some other technical phase."

Some airlines have more agents in an office than the number of telephone trunk lines. Others have fewer agents than trunks, still others maintain one-to-one or vary the ratio according to city. Most officials agree there are too many people in reservations offices who are never available to answer phones—they're handling messages, teletype, waiting lists, etc.—and that ways must be found to make more of them available. One expert says that for every telephone sales employee there is one service employee, and adds that the ratio is often 60-40 in favor of service personnel.

### Personnel turnover creates problems

Other telephone problems: personnel turnover, personnel errors and record discrepancies, training. The latter is becoming increasingly difficult, because a reservationist must be familiar with so many fares and routings—first-class, day and night coach, family fares, tours, etc. "Production and efficiency of a person with less than six months experience is quite low," remarks a reservations director.

Major improvement in the last five years has come through automation. Electronic reservations machines that show space availability have eliminated many calls from



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ticket offices to sales positions in reservations and have made more time available to telephone sales agents to handle calls from the public. Other steps taken by individual lines: addition of many supervisory jobs, maintenance of a quality control monitoring and recording program, more emphasis on telephone techniques.

Significant comment on staffing comes from H. H. Martin, National's director of reservations and ticket offices: "Several times . . . we have attempted to use a formula to determine staffing and each time our service suffered. We now believe there are too many intangible factors in the staffing formula to make such a formula practical. Unless someone is very good at guessing next week's problems, weather and activity, the formula usually tells you what you should have done last week or, at best, yesterday . . .

"To give local reservations managers greater latitude in providing telephone coverage, we have abandoned the old policy of establishing a rigid head count quota within which we formerly had to operate. Now we establish a 'paid man hour' quota to cover a calendar period. By encouraging agents to request short leaves or days off during temporary slack periods, the manager accumulates surplus

'man hours' that may be used to cover additional staffing or overtime during busier periods . . ."

Another problem pinpointed by Martin is that of "being a function with a dual personality and attempting on one hand to be an efficient slide-rule-production-line operation while, on the other, attempting to remain a personalized sales office."

On this point, Maury Perry, United's reservations director, says: "Obviously, aggressive selling lengthens telephone call times and with a given number of personnel, reduces agent availability. Our policy . . . is to concentrate on instant and efficient answering of passenger calls. We have successfully maintained service levels slightly better than the established goals."

Ed Rhatigan, American's reservations director, states: "The objective in all of our telephone call handling . . . is to provide complete and accurate information, attempt to sell a seat to the customer, and convey the impression . . . that we are genuinely interested in serving the customer. Since many inbound calls are not inquiries but direct requests for reservations, we emphasize the service aspects as part of the sales emphasis."

### ANALYSIS OF AIRLINE TELEPHONE SERVICE

	Telephone Answering Standard	Average Length of Phone Calls	Calls Received Per Passenger Boarded	Busiest Telephone Days
<b>AMERICAN</b>	85-95% of incoming calls must be answered in 20 seconds or less.	140-220 secs.	2.14	Mon. & Fri.
<b>BRANIFF</b>	Staffs one sales position for each telephone trunk in big cities; 1 to 1½ trunks in others. All calls to be answered within 30 secs.; achieves this 96% of the time.	2.5 mins.	2.4	Mon.-Tues.-Fri.
<b>CAPITAL</b>	One agent expected to handle 100 calls per shift.	210 secs. at 12 largest stations.	2.25	Mon.-Tues.
<b>CONTINENTAL</b>	Staffs on a "passengers boarded per reservations employee" basis. Figures vary by city.	2 mins. 6 secs. in Denver.	2.2 in Denver.	Mon.
<b>DELTA</b>	80% of calls must be answered within 20 secs.	2.6 mins.	1.3 to 3.3	Mon. & Fri.
<b>EASTERN</b>	70% answered in 15 secs. in stations without switchboard; 70% in 20 secs. with switchboard.	2 mins. 36 secs. in a recent month.	1.74	
<b>NATIONAL</b>	No formula.	3 mins. 16 secs. in Miami. Winter calls longer than summer. New York longer than Miami.	Low of 1.8 in Miami in summer, high of 4.6 in New York in winter.	Mon. & Fri.
<b>NORTHEAST</b>	Based on 450 passengers boarded per agent per month; some variation between stations.	3.5 to 4 mins.	1.5	Mon. & Thurs.
<b>NORTHWEST</b>	75% of calls should be handled immediately; may drop to 50% on heavy days. Well trained agent should handle 90 calls per shift.	not available	2.5 to 3	Wed.-Thurs.-Fri.
<b>TWA</b>	80% answered within 30 secs. through switchboards; 20 secs. in other offices.	3 mins. domestic; 5-6 mins. international.	2.2	Mon.-Thurs.-Fri.
<b>UNITED</b>	70% answered within 30 secs.	3 mins.	1.9	Mon.
<b>WESTERN</b>	One agent answers 100-110 calls per 8 hrs. with good service to customer. Try to hold the average "held" calls to less than 10% of total calls received.	3 mins.	4.5 in large cities, 3 in small. Includes interoffice calls.	Mon. & Thurs.

NOTE: Several airlines note that above figures are system averages, and that there will be variations between large and small stations, also seasonal variations.

*Icelandic Airlines' only street-level salesroom is in New York City (right). Below, Nicholas Craig, 30-year-old head of 15-year-old airline.*



Low fares provide the dollars and sense behind

## IAL's Slow-Poke Success

**P**EOPLE WILL FLY the Atlantic in slow, unpressurized airplanes and take almost a day to do it—if the price is right.

Icelandic Airlines proved this statement to the tune of 34,550 transatlantic passengers last year. The secret of its success lies in the fact that it offers tourist-class accommodations on its four DC-4s at a fare lower than the other airlines' economy class.

IAL claims some distinctions. It's the only airline on the Atlantic that isn't a member of the International Air Transport Association. It's the only European airline on the Atlantic that is 100% privately owned. It says it lead all carriers in load factor during the first nine months of 1959. And it's one airline that worries about getting too big (two DC-6Bs will be added shortly).

Here's why 34,550 people flew IAL to nine European cities last year: its New York-London off-season fare, for example, is \$405.20 roundtrip; on-season is \$447.20. Other airlines' year-round economy roundtrip is \$462.60. Savings: \$57.40 or \$15.40, depending on the season. Jet economy roundtrip is \$30 higher because of the surcharge.

IATA airlines no longer offer off-season fares. But in the slow months, they have family plans. And so does IAL. A man and his wife can make a roundtrip to London under the IATA-economy class-family plan for \$775.20. On IAL they can do it for \$689.40, or \$85.80 cheaper.

IAL's off-season fare is about 5.3¢ a mile, on-season, 5.8¢. IATA economy fare New York-London non-stop—a much shorter distance than IAL's route via Iceland, is 6.7¢ (7.1¢ on the jets).

What kind of service does IAL offer at these low rates? Your pilot is an Icelander or a Scandinavian, U.S. trained. The crew consists of pilot, first officer, radio operator, navigator, engineer and two stewardesses (Icelanders). You leave New York in the afternoon and lunch is served, then

dinner followed by cognac. Next morning, breakfast is eaten in IAL's restaurant at Reykjavik Airport. The flight then proceeds to Glasgow and London, arriving in early evening. Elapsed time has been about 23 hours. A DC-7 will make the trip nonstop in 11 hrs., a jet in 6½. DC-6Bs will reduce IAL's time to 17 hrs. this summer.

In addition to Reykjavik, Glasgow and London, IAL serves Amsterdam, The Netherlands; Copenhagen, Denmark; Gothenburg, Sweden; Oslo and Stavanger, Norway, and Hamburg, Germany.

The airline started from nothing. At the end of World War II, two icelanders, Alfred Eliasson and Edvard Kristinn Olsen, RCAF pilots, heard that a DC-3 had cracked up and was abandoned in Iceland. Despite sub-zero temperatures, blizzards and other obstacles, they salvaged it and started Loftleidir, a company flying charters between Icelandic fishing villages. Later, with their savings and money borrowed from friends, they bought another plane and opened Iceland-Denmark service.

The big break came in 1952, when Loftleidir was permitted to serve New York under a U.S.-Iceland civil air agreement. The next year, the U.S. division, Icelandic Airlines Inc., was formed. The corporate name Loftleidir, which means "to go high," was a hard one to sell in the U.S., and the company now is known as Icelandic Airlines.

Eliasson is now a director and general manager of Loftleidir; Olsen is a director and operations manager. The company is privately owned, with about 1,000 stockholders. It gets no government help, takes mail at non-subsidy rates.

In 1953, passengers totaled 800 on one DC-4 flight a week from New York to Iceland, Copenhagen, Stavanger and Hamburg. Service was expanded to other cities, schedules added, and by 1957 the passenger count had reached 25,000, increasing to 30,000 in 1958, and was 4,550 higher last year. There were nine trips a week last summer. The DC-4s carry 60 seats each in summer, 54 in winter.

Reykjavik must be served on all flights. The reason for this is that IAL is only able to offer U.S.-Europe service because of (1) the U.S.-Icelandic bilateral, permitting New York-Reykjavik flights, (2) Iceland's agreements with the various European nations, permitting Reykjavik-Europe

flights. Thus, a plane leaves New York as Flight 300 and proceeds to Reykjavik under the U.S. agreement. There, it originates as a new flight, No. 316, and proceeds under the European agreements. Passengers don't change planes; only the trip number changes.

A very high percentage of the passengers are U.S. citizens. And 94% of the total go to Europe; only 6% is U.S.-Iceland traffic. Requests for one-way transportation are rare. In summer, almost 100% of tickets are roundtrip.

Who are the passengers who ride IAL? Nicholas Craig, 30-year transportation veteran who heads the U.S. company, says the airline knows its markets well. He lists them as follows:

1. First and second generation Scandinavian-Americans, German-Americans, etc., making trips to the home country. They're frugal people; if they can save a couple of hundred dollars by taking their families on IAL, they can pay for their entire stay abroad.

2. Men in the \$10,000 to \$15,000 salary range who have flown abroad on company business—expense account, first-class—and have now decided to take their families to Europe on vacation. On their own funds, they fly IAL.

3. People who own small businesses, vacationing in Europe. Also, university instructors, with time to travel in the summer.

Load factor in the first nine months of 1959 was 77.6%. In the second quarter, it reached 88.7%, and in September, usually a slow month, it held at 80.6%. The last quarter showed 65.7%. Strangely enough, Craig points out, introduction of jets helped IAL. "They created a substantial additional demand. The total market increased, and we participated."

Why isn't IAL an IATA member? "We would join IATA tomorrow if that organization allowed a scheduled carrier with the type of equipment we have to charge lower fares," Craig says. "Even though we're not a member, we observe every IATA resolution. We appoint the same travel agents, pay the same commissions, etc." Craig, incidentally, once owned his own travel agency, later joined American Express, was Braniff's general traffic manager, was with Pan American 11 years, and was Panagra's general sales manager.

IAL advertises in newspapers throughout the U.S., and in foreign language magazines and papers. But by far its principal effort is directed toward travel agents, upon whom it relies heavily. IAL salesmen don't call on the public—they call on agents.

But Craig says he knows from his agency days that it's largely a waste of time to send agents a lot of promotional material. "They get stacks of it from airlines, steamship companies, etc., and they can't possibly read it all." Therefore, when he has something to say to agents he puts a personal message in his ads in the travel trade magazines.

Sample ad: "Unlike some carriers with salesmen out hustling business in competition with the agents, we at Icelandic play ball with our good friends all year, every year. During the ten-week summer peak we could have filled every flight with direct bookings. Instead we gave preferred treatment to agents, paid them over \$150,000 in commissions . . . and we're proud and happy to do it."

The company's only street-level office is in New York. It has upstairs offices in San Francisco and Chicago; their principal job is to get space for agents.

Cargo traffic handled by IAL in 1959 totaled 464,993 lbs. Its rates are a little lower than IATA's but its available space for this type of traffic is very limited.

IAL has no plans to expand to other cities in Europe. But equipmentwise, it will soon take what for it is a big step—addition of two DC-6Bs, purchased from Pan American. The 80-seat planes will go into service in the spring. No fare increase is planned.

The two DC-6Bs represent a modest expansion that IAL feels sure it can handle. "Our big problem," notes Craig, "is how to remain small. We're making money—not a lot, but we're profitable. If we were bigger, our revenues in the high season would increase substantially—sometimes we turn away as many people as we carry—but in the winter our payload would hit bottom. I'd rather have an 80% load factor year round than very bad winters. And our stockholders are better off."

IAL's maintenance is done at Stavanger on a contract basis by Braathens S.A.F.E., Norwegian airline headed by shipowner L. G. Braathen. However, contrary to some reports, Braathen has no financial interest in IAL.

## U.S. Pilots Really Tip the Payscales!

International Federation of Air Line Pilots Associations has come up with some dramatic statistics on that ever-so-controversial topic—pilot pay. The U.S., with its higher living standards, topped all other nations surveyed by IFALPA with these notable comparisons:

- \* The highest paid U.S. airline captain is paid more than twice as much as the highest paid captain in five countries; more than three times as much as four other nations and more than four times as much as three others. Closest to U.S. is Canada whose pilots receive 43% less.

- \* The highest paid U.S. copilot receives more than the highest paid captain in any other country to the tune of \$248 per month. He also receives \$838 more per month than the lowest paid captain in the U.S.

- \* The lowest paid U.S. captain (at \$1,121 per month) gets more pay than the highest paid captains in nine nations. Only Canada, Belgium, France and Italy pay higher.

The IFALPA statistics, drawn from a straight record of gross pay in each company of the highest and lowest paid pilots and copilots, exclude all forms of expense payments. They include, however, such expenditures as pensions.

The IFALPA survey also disclosed that pilots of most

countries average approximately the same flying time, paid vacations and credit for sick leave each year.

Here's how the 14 countries pay pilots monthly according to the IFALPA survey, the results of which are being incorporated in the Federation's manuals:

Country	Highest-paid		Lowest-paid	
	Captain	Copilot	Captain	Copilot
U.S.A.	\$2,963	\$1,959	\$1,121	\$735
Canada	1,711	1,008	892	401
Belgium	1,367	697	658	380
France	1,360	1,010	850	440
Italy	1,164	716	533	227
U. K.	1,083	728	291	243
Switzerland	1,016	709	545	476
Sweden (SAS)	950	655	676	407
Netherlands	930	488	550	260
Australia	766	490	399	273
Iceland	748	581	599	400
Eire	722	468	532	297
Finland	680	364	445	277
New Zealand	636	437	348	249

# **CANADAIR'S ALL NEW ALL CARGO "FORTY FOUR" SOARS SKYWARD**

**FIRST IN FLIGHT, FIRST IN PRODUCTION, FIRST FOR DELIVERY—  
THAT'S THE SUCCESS STORY OF CANADAIR'S NEW CARGOPLANE**

THERE ARE NO IFS, ANDS OR BUTS ABOUT THIS CARGOPLANE! It is here. It is built for use now. Its first flight marked a giant step forward in its development program. The next step will be its FAA type certification, and then the all-new Canadair Forty Four will go into regular air cargo service with The Flying Tiger Line, Seaboard & Western Airlines and the Royal Canadian Air Force.

THE RIGHT SIZE AT THE RIGHT TIME. The present payload capacity of the "Forty Four" is ideally matched to the forecasted cargo requirements of the 1960's. It is in the '60's that the development rate of air freight will climb sharply toward the major breakthrough in air cargo traffic. The Canadair Forty Four is the right size for highly profitable operations during this rising development period.

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Canadair Forty Four, photographed in flight November 15, 1959

**GENERAL DYNAMICS CORPORATION**

FEBRUARY, 1960

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Every 707 Jet Flagship offers the choice of the luxurious Mercury or economical Royal Coachman service. American's 707 Jets have carried more than one-half million passengers, and logged more than one billion passenger miles. American Airlines' 707 Jet Flagships, first choice of America's experienced travelers.

**AMERICAN AIRLINES** *America's Leading Airline*



# Airline Fixed Charges Outpace Income Gains

By SELIG ALTSCHUL

Growth in the airline industry is a many splendored thing. It is not confined to revenue passenger miles and gross revenues. Sharp increases are also being posted in fixed lease rentals and interest charges. In fact, their rate of gain has outpaced the growth in operating income.

Intense competition created by the Civil Aeronautics Board has made it mandatory for each airline to place itself in the strongest possible marketing position. In short, every airline is determined to at least hold its own over established routes, plus attempting to carve out additional volume over new extensions.

This means that every carrier must obtain the most advanced equipment and offer as competitive a service as possible. Hence, the wave of turboprop and jet orders in recent years. In financing this equipment, all airlines have utilized debt to the greatest degree possible, stretching equity as far as banking groups would permit.

The airlines now have the equipment. And they have also broadened capital structures, expanded mostly by debt which must generate sufficient operating income to cover required amortization and service charges.

From December 31, 1957 to June 30, 1959, outstanding long-term debt of the 12 domestic trunks increased from \$484.5 million to \$715.4 million, or 48%. In the same period, stockholder's equity increased from \$607.9 million to \$716.8 million, or 18%.

Substantial credits have been drawn down subsequent to June 30, 1959, however, with long term debt probably close to the \$1 billion mark at the 1959 year-end and scheduled to grow even higher during 1960. Net worth positions in the interim, in the absence of new equity financing, have shown but a modest gain.

To paraphrase an ancient Roman: "The debt that airlines create lives after them. The god is oft interred with their equipment. For Airline X is an honorable airline. So are they all, all honorable airlines. Capacities should be made of sounder stuff."

Oh judgment, thou art fled to brutish regression. And men have lost their reason."

Such are the ravages of excessive competitive conditions unleashed among the domestic trunk airlines.

The fact remains that fixed charges of substantial magnitude have now become a built-in feature in the capitalizations of the industry.

Leverage has thus been increased. While having the happy facility of mounting earnings on the equity in a rising trend, leverage is a two-way street and in a declining trend can rapidly accelerate losses on the equity.

In fact, the huge increase in fixed charges has seriously curtailed the industry's flexibility in making downward revisions in expenses should conditions so dictate.

In expanding traffic, it is normal that operating expenses will increase merely as a result of the volume of business to be handled. One such charge—and a major one—is represented by lease rentals for newly constructed terminals and maintenance centers. While these lease charges are a cost of doing business, they are of a fixed, long-term nature not easily cut-back.

Interest paid on airline debts, separate and distinct from lease charges, also has skyrocketed over the years.

For 1955, the domestic trunks experienced record operating results with net income of \$63 million (the estimate for 1959 was \$52 million). In 1955, total interest charges paid by trunks aggregated some \$7,381,000. For the 12 months ending June 30, 1959, interest charges added up to \$30,569,000. By mid-61 (see chart), it may reach \$54 million.

How does this rate of growth compare with other significant measures during the same period? The answer is readily found by comparing these rates of increase from calendar year 1955 to the twelve months ended June 30, 1959:

Measure	Growth
Revenue passenger miles flown	34.2%
Revenue ton miles flown	34.4%
Gross operating revenues	44.3%
Net Income	4.8%
Interest charges	318.3%

It is self-evident that the rate of increase in interest charges has sharply out-paced other measures of airline growth.

Of course, extensive leasing of equipment minimizes the amount of financing required through debt, and hence the amount of interest charges. In its place, however, heavy lease rentals will be created and appear as operating expenses. This is particularly true for TWA and Northeast who have extensive leases on aircraft. It is also a factor for American which leases engines and propellers for its turboprops.

As in most financial analyses, however, no one measure can be isolated in a statistical vacuum. Similarly, interest charges for airlines must be equated to basic earning power, cash flows, the amount and quality of earning assets, debt-equity ratios, ability to amortize debt and other factors.

While interest charge for domestic trunks leave danger signals in their wake, a number of local airlines are poised to orbit into outer space with

## TREND OF ANNUAL INTEREST CHARGES

	Twelve Months Ended:			
	Dec. 31, 1955	June 30, 1958	June 30, 1959	June 30, 1961*
American	\$ 927	\$ 2,020	\$ 3,894	\$ 9,800
Braniff	218	919	930	1,900
Capital	215	3,594	3,118	5,250
Continental	175	995	2,310	2,500
Delta	810	1,006	1,435	3,000
Eastern	1,238	2,802	4,511	6,250
National	322	703	1,110	2,200
Northeast	3	487	1,226	1,750
Northwest	353	1,038	2,142	4,500
TWA	1,239	3,598	3,442	4,500
United	1,619	3,763	5,411	11,300
Western	262	913	1,040	1,250
Total	\$ 7,381	\$ 21,838	\$ 30,569	\$ 54,200

Note: \*Estimated, see text. Source: All periods excepting June 30, 1961 from CAB reports. Year ended June 30, 1961 our estimate.

proposed debt-laden capital structures.

The local carriers, for the most part, have been sadly under-capitalized from the start and have stretched their equities so thin that, at times, they have become imperceptible.

To help these carriers while expanding route mileage without serious simultaneous regard to their support, the CAB has seized upon the guaranteed loan as a substitute for earning power and the attraction of equity. The obvious consequence has been even more lop-sided debt structures at increasing dependance upon subsidy to meet interest and amortization charges.

Financing proposals that appear in the local service field frequently defy comprehension and set the stage for a deeper decline into the morass from which the carrier concerned has attempted to extricate itself.

Allegheny Airlines, in its current financing program, affords an interesting example of the dizzy heights to which debt has been projected.

As of October 31, 1958, Allegheny had a net equity of \$570,680. (This may be increased to the degree the

company is successful in obtaining, after taxes, part or all of the \$1,660,154 in back mail subsidy.) It now proposes to issue almost \$13 million in debt securities, most of which will represent new money to pay for an extensive equipment program. At the outset, this will account for a debt ratio of about 95%. Annual interest charges, moreover, will run in excess of \$750,000.

Considerable reliance is placed on CAB policy, which permits temporary mail pay to include interest expense. However, this was adopted during a period when interest payments and subsidy needs were much lower than now projected. (In 1958, Allegheny paid \$69,409 in interest.) And from all indications, the Administration and Congress intend to limit rather than expand future local airline subsidy.

Of course, the fundamental test will remain for Allegheny to obtain revenues—with or without subsidies—not so much to pay the interest charges on its debt, but to develop a sufficient cash flow to meet debt maturities.

All in all—it adds up to a big order.

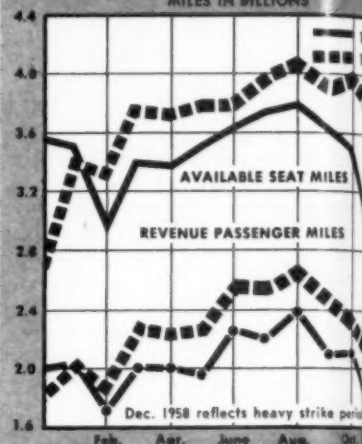
#### ON TIME BOXSCORE—OCTOBER, 1959

	Rank	On Time to 15 min. late		On Time to 5 min. late		16-30 min. late	Over 30 min. late	Total trips reported
		Sept.	October	6-15 min. late	late			
TRUNKS								
American .....	4	72.4%	68.3%	51.9%	16.4%	13.2%	18.5%	6437
Braniff .....	3	77.8	73.6	57.1	16.5	11.4	15.0	1515
Capital .....	12	59.1	52.0	28.4	23.6	22.7	25.3	3579
Continental .....	7	69.1	64.7	46.1	18.6	16.1	19.2	1285
Delta .....	11	64.3	55.5	29.1	26.4	19.6	24.9	1867
Eastern .....	6	72.2	66.4	44.9	21.5	16.0	17.6	5721
National .....	10	68.3	59.1	40.8	18.3	17.1	23.8	1061
Northeast .....	5	65.9	66.5	45.9	20.6	14.0	19.5	2696
Northwest .....	1	83.6	82.9	71.6	11.3	6.9	10.2	1376
TWA .....	8	67.8	63.7	43.1	20.6	18.3	18.0	3301
United .....	2	79.6	76.9	54.7	22.2	11.5	11.6	3981
Western .....	9	64.8	60.2	37.6	22.6	19.6	20.2	1368
LOCAL SERVICE								
Allegheny .....	4	67.3%	76.6%	50.2%	26.4%	9.6%	13.8%	333
Bonanza .....	7	84.2	72.3	57.0	15.3	17.7	10.0	372
Central .....	2	73.8	83.4	57.2	26.2	7.1	9.5	42
Frontier .....	6	72.3	72.6	52.5	20.1	11.3	16.1	274
Lake Central ..	8	87.1	63.1	41.2	21.9	21.9	15.0	246
Mohawk .....	12	64.2	55.2	29.9	25.3	22.5	22.3	1127
North Central ..	9	79.4	62.4	43.4	19.0	16.3	21.3	1497
Ozark .....	11	N.A.	55.3	29.9	25.4	15.9	28.8	808
Pacific .....	10	73.7	61.1	38.2	22.9	17.1	21.8	170
Piedmont .....	1	97.8	89.9	82.9	7.0	6.2	3.9	129
Southern .....	13	60.7	49.2	27.2	22.0	20.4	30.4	499
Trans Texas ..	5	87.6	73.5	42.8	30.7	14.9	11.6	241
West Coast .....	3	91.2	78.5	65.2	13.3	6.4	15.1	173
BOEING 707 and DC-8								
American .....	3	35.7%	38.2%	20.7%	17.5%	25.1%	36.7%	903
Continental .....	1	47.2	42.0	24.7	17.3	19.2	38.8	348
Delta .....	4	17.3	35.0	10.6	24.4	20.6	44.4	160
TWA .....	2	39.3	38.5	21.2	17.3	28.0	34.5	846
United .....	5	0	4.6	NONE	4.6	17.3	78	87
LOCKHEED ELECTRA								
American .....	3	75.6%	63.6%	45.7%	17.9%	14.3%	22.1%	1327
Braniff .....	5	55.7	44.7	28.6	16.1	13.1	42.2	199
Eastern .....	2	72.3	67.0	47.3	19.7	14.1	18.9	1560
National .....	4	62.6	59.3	36.8	22.5	16.9	23.8	378
Northwest .....	1	73.5	71.8	57.3	14.5	15.8	12.4	234
Western .....	6	21.2	18.6	2.7	15.9	32.7	48.7	251
LATE REPORTS								
Capital—Aug ..	12	55.5%	47.4%	22.4%	25.0%	26.5%	26.1%	4550
Capital—Sept ..	12	47.4	59.1	33.0	26.1	22.5	18.4	4275

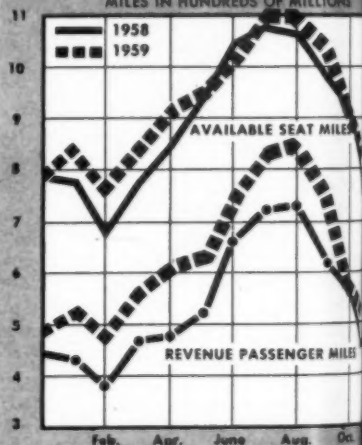
All statistics reflect nonstop and one-stop flights only. Data from airline reports to CAB.

## HOW'S TRAFFIC Among U.S. Airlines

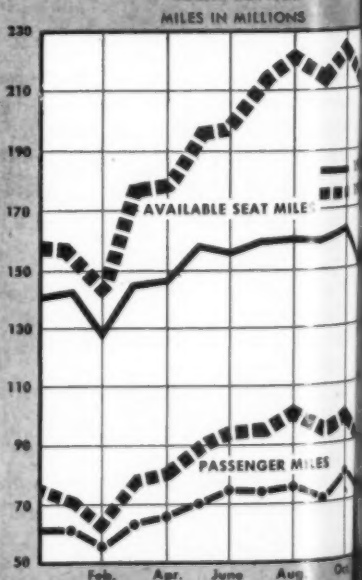
DOMESTIC TRUNKS  
MILES IN BILLIONS



INTERNATIONAL  
MILES IN HUNDREDS OF MILLIONS



LOCAL SERVICE  
MILES IN MILLIONS





# U.S. Airline Traffic for November 1959 vs. 1958

This complete summary compiled by AIRLIFT Magazine from Official CAB data.

	Revenue Passengers (000)			Revenue Passenger Miles (000)			Total Ton-Miles Rev. Traffic			% Available Ton-Miles Used	
	1959	1958	% Change	1959	1958	% Change	1959	1958	% Change	1959	1958
<b>DOMESTIC</b>											
American	467	426	6.5	481,955	415,402	14.0	57,753,989	50,545,144	14.3	56.2	60.1
Brant	172	176	-2.3	74,496	77,237	-3.5	8,133,359	8,528,936	-4.6	44.8	51.0
Capital	302	61	395.1	121,790	25,677	374.3	12,734,260	2,449,335	380.7	50.3	51.2
Continental	98	73	34.2	62,305	35,494	75.5	6,474,515	3,475,845	76.1	37.7	47.8
Delta	255	243	4.9	130,278	121,852	6.9	14,399,811	13,654,440	5.5	49.6	59.0
Eastern	690	511	35.0	359,270	285,553	35.3	37,466,365	27,891,977	34.3	39.2	48.6
National	144	138	4.3	87,011	79,588	9.3	9,363,887	8,627,491	8.5	40.3	50.7
Northeast	96	77	24.7	35,595	31,673	12.4	3,642,423	3,235,795	13.2	39.5	47.8
Trans World	412	257	62.3	351,060	193,343	81.6	38,992,589	21,254,753	83.4	53.9	54.2
United	528	574	-8.0	324,955	402,347	-19.2	39,170,509	48,441,498	-19.1	55.6	59.8
Western	145	108	34.3	76,845	54,321	41.5	8,046,398	5,041,646	37.7	51.3	45.8
	3,656	2,980	22.7	2,204,886	1,793,427	22.9	248,006,722	204,937,197	21.0	49.2	54.9
<b>INTERNATIONAL</b>											
American	9	11	-18.2	8,855	10,381	-14.7	1,099,025	1,358,075	-19.1	56.7	56.5
Brant	4	4	...	6,875	7,200	-4.5	889,594	903,400	-1.5	45.5	43.9
Delta	3	4	-25.0	3,333	4,109	-18.9	412,398	502,040	-17.9	31.6	38.5
Eastern Overseas	30	19	57.9	43,575	27,838	56.5	4,723,330	3,055,115	54.6	55.2	45.1
San Juan	24	15	40.0	36,417	22,727	61.1	3,939,172	2,479,539	58.9	60.3	46.2
Bermuda	3	1	200.0	1,977	1,171	68.8	209,797	124,981	67.9	35.6	30.9
Mexico	3	3	...	4,981	3,940	26.4	574,361	450,595	27.5	39.8	44.7
National	3	7	-57.1	2,363	5,904	-60.0	310,277	683,138	-54.6	29.2	51.4
Northeast	13	9	44.4	22,818	20,193	13.0	5,079,771	4,584,522	10.8	50.5	64.9
Hawaiian	2	1	100.0	5,784	3,081	87.7	636,465	377,645	68.5	46.2	50.8
Panagra	11	10	10.0	16,138	14,290	12.9	2,330,810	1,988,528	17.2	58.9	58.9
Pan American System	205	188	9.0	335,612	285,805	17.4	48,506,029	42,685,752	13.6	63.0	63.8
Latin American	90	91	-1.1	105,014	95,964	9.4	15,806,863	14,437,918	9.5	63.4	63.8
Pacific	84	74	13.5	130,023	102,907	26.4	18,503,409	15,146,511	22.2	61.4	60.1
PDX/SEA-HON.	27	21	28.6	96,562	84,841	13.8	13,595,841	12,672,502	7.3	66.4	70.0
Alaska	2	1	100.0	5,898	2,857	106.4	660,207	333,420	98.0	45.0	41.1
Trans Caribbean	4	2	100.0	4,013	2,093	91.7	599,916	428,821	39.9	42.3	42.9
Trans World	6	6	...	10,368	9,564	...	1,409,386	834,110	...	82.5	71.6
United	13	18	-27.8	33,539	57,450	-41.6	6,006,229	8,107,256	-25.9	57.2	70.5
Western	5	7	-28.6	13,516	16,139	-16.3	1,575,337	1,868,680	-15.7	59.7	48.8
	4	2	100.0	6,457	3,300	95.7	716,021	369,767	93.6	64.0	65.8
	306	285	7.4	530,449	462,173	14.8	73,058,207	66,940,383	9.1	60.2	61.8
<b>LOCAL SERVICE</b>											
Allegheny	49	41	19.5	8,863	8,010	10.6	911,889	824,939	10.5	45.6	57.0
Bonanza	19	14	35.7	4,738	3,359	41.0	472,662	336,739	40.4	42.2	42.5
Central	13	11	18.2	2,448	2,242	9.2	254,631	235,249	8.2	31.3	31.2
Frontier	26	17	52.9	6,843	4,567	50.4	732,566	525,331	39.6	38.9	51.1
Lake Central	20	14	25.0	3,149	2,729	15.4	321,147	280,646	14.4	44.1	46.4
Mohawk	51	41	24.4	9,931	8,002	24.1	996,563	803,022	24.1	56.2	58.3
North Central	73	60	21.7	12,711	9,896	28.4	1,329,694	1,010,380	31.6	41.1	47.4
Ozark	45	35	28.6	7,788	6,783	14.8	804,845	693,862	16.0	43.6	51.3
Pacific	40	32	25.0	9,434	7,209	39.9	926,501	706,779	31.1	52.6	49.4
Piedmont	37	36	2.8	7,982	7,334	4.6	801,053	769,849	4.1	43.1	57.1
Southern	23	19	21.1	4,140	3,627	14.1	433,587	377,477	14.9	36.7	42.8
Trans-Texas	24	21	14.3	5,629	4,785	17.6	609,672	510,554	19.4	38.6	43.1
West Coast	29	19	52.6	6,796	3,814	78.2	676,932	374,718	80.7	39.7	44.4
	449	362	24.3	90,251	72,657	24.2	9,272,742	7,449,545	24.3	43.1	49.1
<b>HELICOPTERS</b>											
Chicago	20	9	122.2	348	169	105.9	34,089	17,104	99.3	43.6	26.1
Los Angeles	3	2	50.0	94	84	11.9	15,400	13,021	18.3	61.4	55.1
New York	11	8	37.5	215	169	27.2	23,580	19,385	21.6	48.6	48.2
	34	19	78.9	657	422	55.7	73,069	49,510	47.6	48.1	38.3
<b>TERRITORIAL</b>											
Aloha	28	12	133.3	4,665	1,601	91.4	381,642	135,916	180.8	62.6	52.3
Caribbean	26	19	36.8	1,801	1,321	36.3	196,685	144,793	35.8	73.6	65.8
Hawaiian	43	29	48.3	8,006	4,316	85.5	897,276	469,598	91.1	58.2	53.1
	97	60	61.7	14,472	7,238	99.9	1,475,603	750,307	96.7	61.1	55.0
<b>ALASKA</b>											
Alaska	9	6	50.0	7,193	3,104	131.7	1,090,783	582,468	87.3	58.1	37.2
Alaska Coastal	3	3	...	371	230	61.3	45,044	32,328	39.3	64.7	66.1
Cordova	1	1	...	129	96	34.4	66,880	45,778	46.1	47.9	49.0
Ellis	3	3	...	285	184	54.9	33,186	23,164	43.3	77.5	69.7
Nor. Consolidated	2	1	100.0	535	381	40.4	142,101	107,689	31.9	60.7	63.1
Pacific Northern	7	7	...	5,497	4,590	19.6	994,767	1,114,558	-10.7	50.3	57.0
Rescue	1	1	...	751	993	-24.4	181,420	248,395	-27.0	56.7	64.9
Wien	2	2	...	496	610	-18.7	137,315	314,815	-56.4	42.6	57.7
	28	24	16.7	15,257	12,188	25.1	2,691,496	2,469,193	9.0	34.0	51.5

## ALL CARGO

(Ton miles in thousands)	Mail			Express			Freight			Total Scheduled			Total All Services		
	1959	1958	% Change	1959	1958	% Change	1959	1958	% Change	1959	1958	% Change	1959	1958	% Change
Aazico	13,303	13,303	...	20,641	20,641	...	566,014	566,014	...	599,958	599,958	...	5,809,530	3,099,194	87.5
Flying Tiger	80,532	31,439	156.2	73,034	67,008	9.0	7,055,170	6,147,416	14.8	7,208,736	6,245,863	15.4	8,874,499	12,057,996	-26.4
Riddle	9,148	34,828	-73.7	21,247	52,563	-59.6	2,010,098	2,570,124	-21.8	2,040,493	2,657,515	-23.2	2,079,920	5,544,989	-62.5
Slick (C)	...	...	...	...	...	...	562,986	651,718	-13.6	562,986	651,718	-13.6	6,455,131	2,012,256	230.7
Aerovias Sud	...	...	...	...	...	...	...	...	...	...	...	...	684,219	675,976	1.2
Seaboard & Western	N.A.	N.A.	...	N.A.	N.A.	...	N.A.	N.A.	...	N.A.	N.A.	...	N.A.	N.A.	...
	89,680	79,570	12.7	94,281	140,212	-32.8	9,628,254	9,935,272	-3.1	9,812,215	10,155,054	-3.4	24,103,299	23,390,411	3.0

N.A.—Not Available.

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# Preview: Turbine Deliveries Next Six Months

The pace of turbine aircraft deliveries is quickening. During the first six months of 1960, U.S. and foreign airlines will receive no fewer than 164 new jets or turboprops, not including those produced by non-U.S. manufacturers. Here AIRLIFT presents the next six months in turbine deliveries by Boeing, Convair, Douglas, Fairchild and Lockheed.

In total orders, the combination of Boeing's 707 and 720 lead with 198, Lockheed is second at 179 with the Electra and Douglas third with 152 DC-8s.

In numbers delivered, Lockheed leads with 121 as of January 1 with Boeing trailing at 84. Aircraft with the most airline customers is the DC-8 with 18. Both Boeing and Lockheed have 16.

## BOEING 707 and 720

Airline	Total on order	Delivered as of 1 Jan. '60	To be delivered between 1 Jan. and 30 June '60
AIR INDIA	3 (420)	—	3
AIR FRANCE	17 (320)	3	5
AMERICAN	26 (120)	25 (120)	—
BOAC	15 (420)	—	4
BRANIFF	5 (220)	1	3
CONTINENTAL	4 (120)	4	Order complete
CUBANA	2 (120)	—	—
IRISH	3 (720)	—	—
LUFTHANSA	4 (420)	—	3
PANAM	29 (6-120)	6 (120)	9 (320)
QANTAS	7 (120)	14 (320)	Order complete
SABENA	5 (320)	7	4
SO. AFRICAN	3 (420)	—	—
TWA	27 (15-120)	15 (120)	8 (320)
UNITED	18 (720)	4 (320)	6
VARIG	2 (420)	—	2
USAF	3	3	Order complete
<b>TOTAL</b>	<b>198</b>	<b>84</b>	<b>49</b>

\*Boeing at presstime received Lufthansa order for 4 720Bs for delivery in 1961. ΔAA's 720 order is split: 15 720s and 10 720B (fan engine).

## CONVAIR 440 and 600

Airline	Total on order	Delivered as of 1 Jan. '60	To be delivered between 1 Jan. and 30 June '60
*AMERICAN (600)	25	—	—
CAPITAL (880M)	7	—	—
CIVIL AIR TRANS-PORT (880M)	1	—	—
**DELTA (Basic 880)	10	—	(5) 1 in Jan., March April, May and June.
***REAL (880M)	3	—	—
****SAS-SWISSAIR (600)	9	—	—
TWA (Basic 880)	30	—	(17) Deliveries will be 2 in Feb., 2 in Mar. (a total of five for Mar. including the 3 for Nov., Dec. and Jan.), 3 in Apr., 3 in May, and 4 in June.
<b>TOTAL</b>	<b>85</b>	<b>0</b>	<b>22</b>

\*American has optioned another 25 600s.

\*\*Delta has optioned another 8 Basic 880s.

\*\*\*Real switched its original order from Basic 880s to 600s and has now switched to 880Ms. Real also has one 880M on option.

\*\*\*\*SAS-Swissair has optioned 4 600s.

Total aircraft on option: 38.

Note: Order by Transcontinental has been dropped from Convair books.

## DOUGLAS DC-8

Airline	Total on order	Delivered as of 1 Jan. '60	To be delivered between 1 Jan. and 30 June '60
ITALIA (C)	6	—	(3) 1 in 1st Qtr., 2 in 2nd Qtr.
CANADIAN PAC. (C)	4	—	—
ATA (J-57)	6	6	Order complete
STERN (J75 Dom.)	16	—	(8) 6 in 1st Qtr., 2 in 2nd Qtr.
RIA (OW)	3	—	—
PAN (OW)	4	—	(2) both in 2nd Qtr.
MA (OW)	12	—	(4) 3 in 1st Qtr., 1 in 2nd Qtr.
NATIONAL (J75 Dom.)	3	—	(2) both in 1st Qtr.
RTHWEST (OW)	5	—	(3) 1 in 1st Qtr., 2 in 2nd Qtr.
LYMPIC (OW)	2	—	—

Airline	Total on order	Delivered as of 1 Jan. '60	To be delivered between 1 Jan. and 30 June '60
PANAGRA (OW)	4	—	(3) 1 in 1st Qtr., 2 in 2nd Qtr.
**PAN AMERICAN (OW)	21	—	(8) 4 in 1st Qtr., 4 in 2nd Qtr.
PHILIPPINE (OW)	2	—	—
SWISSAIR (OW)	3	—	(2) 1 in 1st Qtr., 1 in 2nd Qtr.
SAS (OW)	7	—	(4) 2 in 1st Qtr., 2 in 2nd Qtr.
TAI (OW)	2	—	(1) 1 in 2nd Qtr.
TCA (C)	10	—	(4) 4 in 1st Qtr.
***UNITED	40	15	(9) 5 in 1st Qtr., 4 in 2nd Qtr.
<b>TOTAL</b>	<b>152</b>	<b>21</b>	<b>55 29 (1st Qtr.) 25 (2nd Qtr.)</b>

\*Japan's recently announced order for an additional aircraft is not considered as firm by Douglas until Japanese govt. approval is obtained.

\*\*Includes Panair do Brazil (4).

\*\*\*Exact breakdown of engine types vs. aircraft delivered is not available. (C)=Conway engines. (OW) Over-water or International version with J75 engines.

## FAIRCHILD F-27

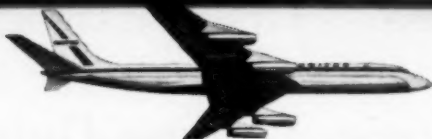
Airline	Total on order	Delivered as of 1 Jan. '60	To be delivered between 1 Jan. and June, '60
AREA	1	1	—
AVENSA	5	5	—
ALOHA	4	3	3
BONANZA	10	6	2
NORTHERN CONSOLIDATED	3	3	—
OZARK	3	3	—
PACIFIC	4	4	—
PIEDMONT	8	8	—
QUEBECAIR	3	3	—
TRANS MAR DE CORTES	1	1	—
WEST COAST	6	6	—
WIEN ALASKA	2	2	—
*CORPORATIONS	24	17	7
<b>TOTAL</b>	<b>78</b>	<b>64</b>	<b>12</b>

\*Corporations include Bank of Mexico, Butler Aviation (Pepsi Cola), Champion Spark Plug Co., Continental Can Co., General Tire & Rubber Co., Ideal Cement Co., Johns-Manville Corp., Kimberly-Clark Corp., Noland Co., Raytheon, Reynolds Metals Co., R. J. Reynolds Tobacco Co. and Westinghouse Electric Corp.

## LOCKHEED ELECTRA

Airline	Total on order	Delivered as of 1 Jan. '60	To be delivered between 1 Jan. and 30 June '60
ANSETT/ANA	3	2	1
AAL	35	25	10
BRANIFF	9	8	1
CAPITAL	5	0	5
CATHAY PACIFIC	2	2	—
EAL	40	40	—
KLM	12	4	6
NATIONAL	23	12	—
NORTHWEST	18	10	4
QANTAS	4	4	—
PSA	4	3	—
TEAL	3	3	—
TRANS-AUSTRALIA	2	2	—
WESTERN	12	5	4
TRANS-AMERICA	—	—	—
AERO CORP.	2	—	2
NAVY (YP3V-1)	1	—	—
PRIVATE OWNER	1 (Reportedly Hughes)	—	—
ALLISON	1 (Del.)	—	—
GARUDA INDONESIA	3	—	—
<b>TOTAL</b>	<b>179</b>	<b>121</b>	<b>33</b>

(Order has slipped to about 3rd Quarter of '60)



## ONLY UNITED AIR LINES OFFERS YOU THE BEST OF THE JETS DC-8 JET MAINLINER SERVICE TO MAJOR CITIES COAST TO COAST

United Air Lines now links the nation's many local airlines with DC-8 Jet Mainliner® service coast to coast, and soon to Hawaii.

The DC-8 marks an important improvement in the interline co-operation between United and these other airlines to give travelers—and shippers

too—better, faster, often more economical service.

Throughout the coming year, as more DC-8 Jet service is introduced, United Air Lines efforts will be to make this co-operation work even more effectively for the benefit of its good friends and neighbors, the local airlines.



**THE BEST OF THE JETS...PLUS UNITED'S EXTRA CARE**



# Everybody Wants To Build Caravelles!

By JOSEPH S. MURPHY

Sud Aviation's popular twin-jet Caravelle is rewriting the book of air transport marketing. The industry has seen nothing like it in the past.

Today, almost five years since first flight (May 27, 1955), the transport with the engines in the back has become the hottest topic since Pan American placed its dual order for 707s and DC-8s.

Consider this line-up of developments:

- **United Air Lines** is on the verge of ordering 20, perhaps more. UAL president W. A. Patterson has said openly that such a decision may come soon. Industry sources indicate money already has changed hands, if only to protect delivery positions.

- **General Electric** is spending somewhere between \$2 million and \$3 million for its own Caravelle to qualify the CJ805-23 fan engines. It will get its airplane in July, no doubt looks to the potential of a UAL retrofit program.

- **Douglas, General Dynamics** and **Boeing** are competing for the role of Caravelle builder in the U.S. In unprecedented fashion, a 14-man Douglas technical team made the long jaunt from Santa Monica to Toulouse between Christmas and New Years. The group was still studying Caravelle production prospects three weeks later when president Donald Douglas, Jr. and v.p.-commercial programs, J. R. McGowen arrived for high-level talks with Sud officials. This demonstration by Douglas can hardly be construed as a routine appraisal of the Caravelle.

- No fewer than four big engine makers—**Rolls Royce**, **GE**, **Pratt & Whitney** and **Allison** (as Rolls' licensee) are overlooking no opportunity to snare a share of potential Caravelle engine business. Specifications have been set by Rolls and GE (see tables). P&W figures for both the JT3C-7 and JT3D (fan) versions are now being worked up by P&W engineers at Toulouse.

Why the sudden explosion of manufacturer interest in the Caravelle? The potential UAL order and others that might follow obviously are part of the answer. And the French jet could prove a very inexpensive alternative for

Douglas or Boeing in lieu of investing millions of dollars in a new project such as the DC-9 or 727.

Probably the biggest single answer, at least from the airline standpoint, is the solution it offers in highly competitive medium haul routes typified by

New York (LaGuardia) to Chicago (Midway). American Airlines plans to operate Convair 600s between these two airports and right now the Caravelle appears to be United Air Lines' answer to that competition. With both AA and UAL operating jets in this



Newest of Caravelle operators is Varig which uses the twin French-built jet in five stop service between Rio de Janeiro and Idlewild (above).

## SPECS ON ALL THE CARAVELLES

	I	III	VI	VIR	VII	VIII
Engine	RA29/I	RA29/3	RA29/6	RA29/6	CJ805-23	RB141/3 or RB141/11
Manufacturer	Rolls Royce	Rolls Royce	Rolls Royce	Rolls Royce	General Electric	Rolls Royce
Takeoff thrust (lbs.)	10,500	11,400	12,200	12,200	16,100	13,980 (-3) 15,000 (-11)
Max. takeoff weight	95,900	99,200	103,620	105,600	110,230	110,230
Max. landing weight	91,340	94,500	98,700	100,500	104,720	104,720
Max. zero fuel weight	76,060	76,060	78,300	79,200	81,570	81,570
Operating weight empty	57,760	58,640	59,500	60,500	62,170	62,170
No. of seats						
1st cl./coach	80	80	64/80	64/80	68/85	68/85
Available 1st. 35th.	In Opn.	May '60	Nov/Dec 60 Nov/Dec 61	May/June 61 May/June 62	Oct 61 Oct 62	Jun/Jul 62 Jun/Jul 63

Note: Model VIR designates addition of reversers. Models VII and VIII also will be equipped.

### General Dimensions

Fuselage length	105 ft.	Wing sweep	20 degrees
Fuselage height	28 ft. 7 in.	Fuel capacity	4,890 gals. (U.S.)
Wing area	1,582 sq. ft.	Cabin length	52 ft. 6 in.
Wing span	112 ft. 6 in.	Cabin diameter	9 ft. 10 in.

Note: Models VII and VIII will have fuselage extended 39 in. to accommodate one additional row of seats.

service, other airlines will be forced to make similar moves or accept the competitive consequences.

The significant factor in the Caravelle's current wave of popularity is that prospective buyers have scrapped past insistence on four-engine safety. Carriers are just about convinced that passengers have lost their "consciousness" of two versus four-engine safety, mostly due to the good operating record of Convairs and Martins over the past 10 years.

Another factor weighing strongly in support of the Caravelle is its long expected life span. One potential customer estimated its useful life could extend as far ahead as 1971!

Passenger appeal is another strong Caravelle attraction. Scandinavian Airlines System, polling Americans who flew aboard the airplane in Europe last summer, reports that 75% favored its introduction in the U.S. by a U.S. airline. Of this same group, 79.1% rated cabin noise as "completely absent."

In its early operation, SAS reports Caravelle costs on the same route as the DC-7C (both with 70 passengers) were 20 to 25% below the Douglas piston transport. In cost per ton-mile, the Caravelle's advantage dropped to only 17% due to the DC-7C's greater freight capacity.

In another U.S. airline evaluation of the Caravelle, direct operating costs

were forecast at 105¢ per aircraft mile with maintenance accounting for 20¢, flying operations 65¢ and depreciation 20¢, based on average 500-mile route.

This same study gave the French jet a potential annual productivity of 492,000 aircraft miles per \$1 million invested based on a cost of \$2.5 million per aircraft (it's now nearer to \$2.75- or \$3-million). Translated into seat-miles, this becomes 37.4 million per \$1 million investment figuring a 76-passenger mixed-class interior. For break-even operations, the Caravelle was estimated to need 44 passengers on a 300-mile service, 38 for 400 miles, 34 for 500 miles and 32 for 600, the latter only a 42% load factor.

Where does the Caravelle stand now? The Mark I, in service with Air France, SAS and Varig, goes out of production in April 1960 in favor of the Mark III. The original Rolls Avon RA29-1 (Mark 522) gives way to the RA29-3 (Mark 527).

Caravelle IIIs will go to Air France, SAS, and others, and most original Mark Is will be converted to the later engines increasing thrust from 10,500 to 11,400 lbs. For U.S. markets, the Caravelle will be offered as the Mark VI, VII and VIII with the VIR and later with thrust reversers.

#### Caravelle Order Book

As of January 1, Caravelle orders stood at 60 with options boosting the potential total to 83. Eight airlines have ordered, with this schedule of deliveries as of Jan. 1, 1960:

**Air France**—Eight of 24 delivered; also one per month Jan.-Apr. '60, May (2), June (1), Sept. (3), Oct. (2), Nov. (3) and Dec. (1).

**SAS**—Original order for six with 19 plane option. Has exercised option for six in June '58, four in Oct. '58 and 1 in Oct. '59, leaving 8 remaining. Of 17 ordered, six are delivered. Balance due in Feb. '60 (1), Mar. (3), Apr. and May (1), June (2), July (2), Dec. (1).

**Varig**—Two ordered, one optioned. Two already delivered.

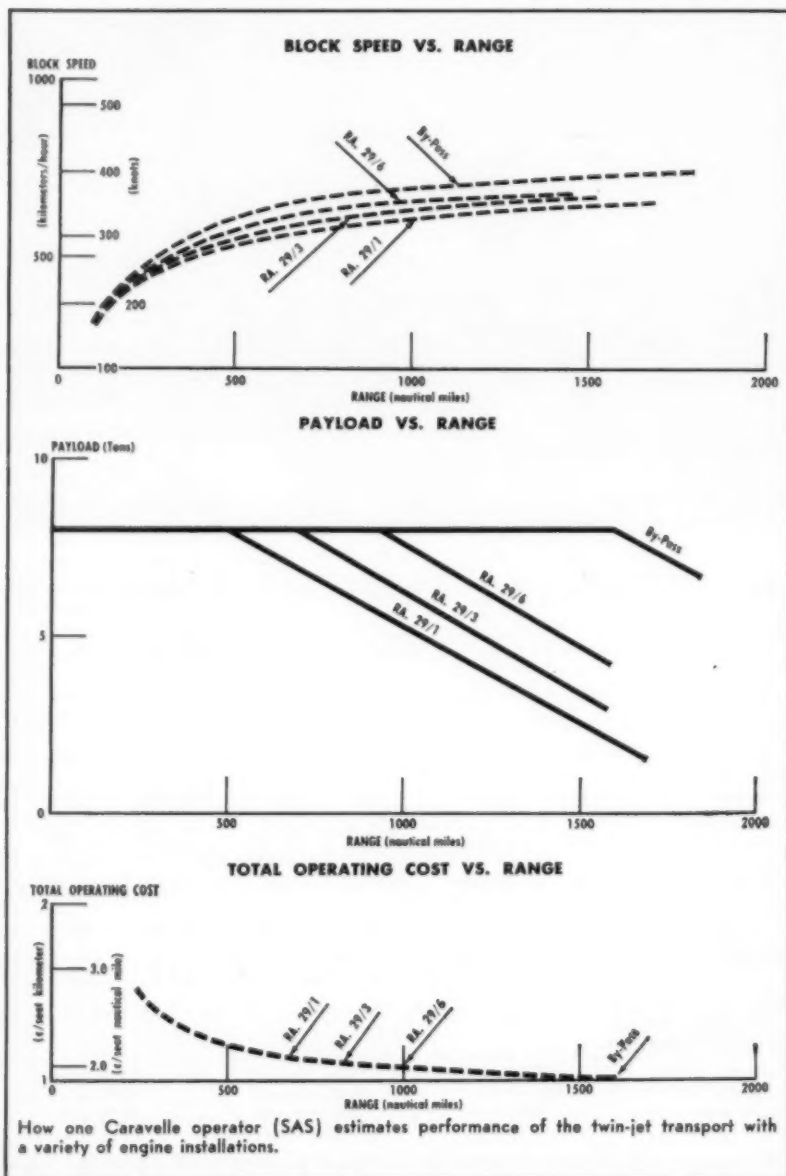
**Finair**—Three ordered, due for delivery in Jan., Mar. and Apr. '60.

**Alitalia**—Four ordered, and four optioned, due for delivery in April-July (one/mo.).

**Airalgier**—Four ordered, due for delivery in Jan. '60 (2), Mar. & Sept. (1).

**Sabena**—Four ordered, and four optioned, due for delivery in Jan. '61 (3), Feb. (1).

**Air Maroc**—One ordered for delivery in Apr. '60.



# SYMBOL OF AIRLINE ACHIEVEMENT



**BEA** will soon be adding the Comet 4B jet airliner to its fleet of Viscounts—the largest in the world. **BEA** already provides greater variety and frequency of flights over Europe than any other airline.

**BEA** carried 2,828,715 passengers during the year ending 31st March, 1959.

**BEA** aims to provide air services to an ever increasing public.

**BEA** continues to press for cheaper fares on regular services in order to bring air travel within reach of everyone.

**BEA** earns a third of its revenue abroad including nearly \$5 million last year.

**BEA** has now operated profitably for five consecutive years.



**EUROPE'S FOREMOST AIRLINE**



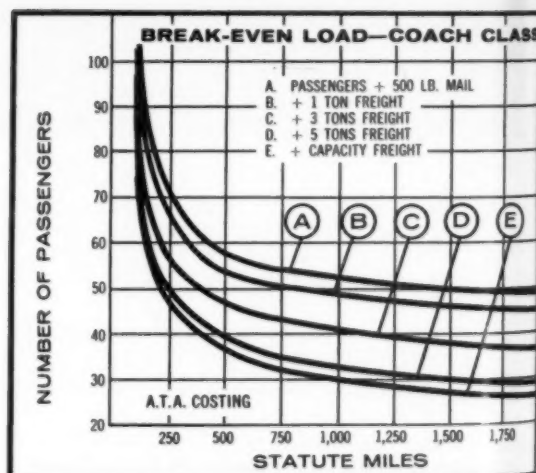
## LOWEST JET AGE OPERATING COSTS

No other jet age airliner—pure jet or jet-prop—can match Vanguard's economy of operation. Seat-mile costs can be *under 1¢* on all stages over 1,000 miles; and only 1.4 cents at 200 miles.

"Passenger only" break-even loads are 61 first class or 68 coach class on a 250-mile sector, and as low as 46 and 52 passengers respectively at 1,000 miles. This is *without* freight revenue. With 3 tons of freight, only 55 coach passengers are needed to break even at 250 miles, and 40 at 1,000 miles. Vanguard's below-deck cargo holds enable the aircraft to be a profit-maker on off-peak services and in off-peak seasons.

Low altitude routing will not adversely affect these low costs. The difference in trip cost between a 500-mile sector flown at 10,000 feet and 20,000 feet (most economical) is only \$44.

Vanguard's low operating costs and large, well-balanced payload capacity of 29,000 pounds mean the *highest profit potential in airline history!*



This graph emphasizes the Vanguard's considerable cargo-carrying capacity. When freight is carried, the economic flexibility of the aircraft is underlined. With freight the passenger need comes down to as low as 47 passengers on a 250-mile stage and 30 for 1,000 miles.

NEWEST FROM THE WORLD LEADER IN JET-PROP AIRCRAFT . . .  
POWERED BY FOUR ROLLS-ROYCE TYNE ENGINES





139 passengers . . . 8 tons of freight . . . 425 mph . . . 2300-mile range

As a result, Vanguard makes the introduction of promotional fares and other traffic-builders not only possible—but highly *profitable*.

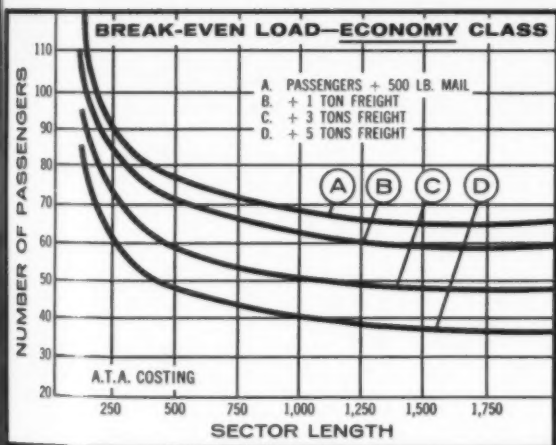
#### TOPS IN PASSENGER APPEAL TOO!

Inside the comfortable cabin, Vanguard will be as quiet as the Viscount. Vanguard block speeds have been proved as fast as jets right up to medium-distance sectors; though Vanguard has been flown at less than half jet costs! And, due to the absence of ATC approach, stacking and noise problems, there won't be as many delays in high-traffic areas.

For further details and a cost analysis based on your operations, contact Christopher Clarkson, U.S. representative, 10 Rockefeller Plaza, New York 20, N. Y.

#### WORLD'S ONLY 2nd GENERATION JET AGE AIRLINER!

Vanguard benefits greatly from the more than 2 million hours of worldwide in-the-air experience of 400 Viscounts . . . and there is *no* substitute for experience!



The "economy" class promotional fare potentialities of the 139-seat Vanguard are shown by these curves which give the break-even needs on all costs (indirect costs taken as 100% of direct) at a fare rate of only 4 cents a mile. This is a 25% reduction in existing coach fares. Freight revenue is taken as 21.8 cents a ton mile; mail as 34.7 cents, and express as 34.3 cents.

VICKERS

# VANGUARD

VICKERS-ARMSTRONGS (AIRCRAFT) LTD. • WEYBRIDGE, ENGLAND • MEMBER COMPANY OF THE VICKERS GROUP

# Airport Cost Accounting That Works

- *What does it cost to provide a square foot of rentable terminal space to a tenant?*
- *What does it cost my airport to land an aircraft at a given weight?*
- *Does it pay me to continue handling the sale of gas and oil?*
- *Do my financial statements reveal which users of my airport are paying their way?*
- *Is the information supplied by my accounting system sufficiently reliable to use in negotiating leases and setting rates?*



By ROBERT M. POOL\*

The ultimate test of any accounting system lies in how well management can use the information it records. This is as true of a private business striving for profits as of a publicly-owned airport operated for the public good.

The five questions posed above can be applied to any airport operation. In my experience (Mr. Pool has installed or modified cost accounting at about 30 airports in the U.S.) answers to these questions have been built into the cost accounting system where they reveal themselves continuously in periodic reports.

Airport managements at Evansville, South Bend, New Orleans, Fresno and Rochester, Minn. have used this information for years to justify rates charged in contracts and leases.

Cost accounting systems now exist at many airports. But too many systems merely compare revenues of various activities with expenses chargeable to them and tell the airport manager how profitable each operation is.

A system of this type is not being used to its full potential unless it dynamically integrates operational statistics for various activities to revenues produced by them to arrive at a cost to provide a salable "unit of use" of a given facility.

Most airport cost accounting systems adequately separate revenues and costs by activity or area in what are known as revenue-producing or primary cost centers. These are: airfield or landing area; terminal building and area; rented buildings and areas; leased areas; proprietary activities (fueling). Revenues earned by these cost centers are credited to them while costs to operate and maintain them are charged directly against them.

Accounting also lists certain second-

\* Partner, Pool & Simmons, Dayton,

ary cost centers, essential activities which produce no revenue. These costs, distributed over revenue producing centers, include administration, general shop, equipment maintenance and operations, protection and security, public areas and roads, and utility systems owned and operated by the airport.

To supplement the usual revenue and cost information, a good accounting system should provide for collection of statistics on all cost centers. For the airfield: takeoff or landing weights, compiled by months, quarters and years. For the terminal and other buildings: an up-to-date record of available rentable area.

Whenever revenue and cost data are made available to management, these "statistics of use" should be applied to them in order to arrive at unit costs for these services (see cost analysis statement, p. 51). Such quarterly or annual statements instantly show how much it costs to land an airplane on the basis of 1,000-pound units or what it costs to provide rentable terminal floorspace.

Dissected further, the statement applies costs to volume for various classes of operators (airline, military, general aviation) so management can compare cost versus income for each of these users.

Once the right financial data is available, management can readily tell which of the proprietary functions are paying their way. At Tampa International Airport, for example, cost analysis proved it was not profitable for airport management to handle the sale of gas and oil. Costs were exceeding income.

Frequently, airports learn that it would be better to lease a building or site to a tenant on a net-lease basis

and avoid all maintenance responsibility. Such was the case at St. Joseph County Airport, South Bend.

At Donnelly Field, Montgomery, Ala., segregation of military landing area costs became the basis on which the airport received payment by the military for joint use of the facility. At Miami International, the accounting system was so designed that it was possible to determine whether income from facilities provided by individual issues of revenue bonds were meeting servicing charges required over and above operational costs.

Cost systems such as these can be set up to meet local municipal, county or state accounting needs. It has never been necessary to add additional personnel to record or report the information.

It has been my experience that many airport managers feel they already have a cost accounting system in operation. But it is often no more than a simple division of revenues and expenses into such categories as aviation and non-aviation, and a listing of operating and maintenance expenses.

I don't propose to represent the cost analysis statement as something that would eliminate all other airport financial reports. Most airport managers require a monthly statement comparing actual income and outgo with their budget.

Management should also receive a monthly record showing the age of various accounts receivable. Further, an annual audit should be made by an independent CPA. In addition to conventional statements of operations, an orthodox balance sheet should be included in the auditor's report showing fixed assets, depreciation allowances, long-term indebtedness and equities of sponsor and grants-in-aid.

# COST ANALYSIS STATEMENT-TYPICAL AIRPORT

(Period—July 1, 1959 to September 30, 1959)  
(Period—7-1-59 to 9-30-59)

Account Title	Total Airport	Landing Area	Terminal Facilities & Area	Net Leased Bldgs. & Areas			Rented Bldgs. & Areas			Other Revenue Activities	Construction & Other
				Civil	Military	Agric.	F.B.O.	T-Hangers	Other		
<b>DISBURSEMENTS:</b>											
<b>DIRECT COSTS:</b>											
Salaries .....	\$2,374.51	\$1,949.66	\$ 424.85								
Per Diem Labor .....	613.00	458.00	155.00								
Telephone & Telegrams .....	66.00	66.00									
Utilities—Electricity .....	1,243.16	531.72	624.98	\$ 43.23			43.23				
Utilities—Water & Sewage .....	586.20	81.47	105.20	303.93			95.60				
Janitorial & Bldg. Supplies .....	173.88		128.64				45.24				
Maint. to Bldgs. & Grounds .....	1,235.72	699.24	331.02	176.90			28.56				
Sub. Total: .....	6,292.47	3,786.09	1,769.69	524.06			212.63				
<b>ALLOCATED COSTS:</b>											
Administration .....	6,869.91	3,215.12	625.16	893.09	\$ 961.79		267.93	\$ 329.75	\$ 577.07		
General Shop & Equip. M. & O. ....	2,262.35	1,696.76	226.23				113.12	113.12	113.12		
Sub. Total: .....	9,132.26	4,911.88	851.39	893.09	961.79		381.05	442.87	690.19		
<b>TOTAL DISBURSEMENTS:</b> .....	<b>15,424.73</b>	<b>8,697.97</b>	<b>2,621.08</b>	<b>1,417.15</b>	<b>961.79</b>		<b>593.68</b>	<b>442.87</b>	<b>690.19</b>		
<b>RECEIPTS:</b>											
<b>SATELLITE INCOME:</b>											
Sale of Electricity .....	94.89		64.89				30.00				
Sale of Water & Sewage .....	226.80		66.00	104.70			56.10				
Vending & Coin Machines .....	9.11		9.11								
Reimbursement of Damages .....	15.00	15.00									
Sub. Total: .....	345.80	15.00	140.00	104.70			86.10				
<b>DIRECT COSTS CHARGEABLE TO USERS:</b> .....	<b>15,078.93</b>	<b>8,682.97</b>	<b>2,841.08</b>	<b>1,312.45</b>	<b>961.79</b>		<b>507.58</b>	<b>442.87</b>	<b>690.19</b>		
<b>BASIC USER INCOME:</b>											
Space Rentals .....	2,250.61		1,577.30				693.31				
Net Leased Rentals .....	4,825.00			2,325.00	2,500.00						
Landing Fees .....	3,992.75	3,992.75									
Fuel Flowage Fees .....	751.06	751.06									
Military Use Payment .....	3,375.00	3,375.00									
Aircraft Storage .....	1,105.25	251.25					854.00				
Fuel Tank Rentals .....	1,495.09								1,495.09		
Ground Transportation .....	76.98		76.08								
Sub. Total: .....	17,871.74	8,370.06	1,634.28	2,325.00	2,500.00		693.31	854.00	1,495.09		
<b>TOTAL RECEIPTS:</b> .....	<b>18,217.54</b>	<b>8,385.06</b>	<b>1,774.28</b>	<b>2,429.70</b>	<b>2,500.00</b>		<b>779.41</b>	<b>854.00</b>	<b>1,495.09</b>		
<b>CASH PROFIT OR LOSS:</b> .....	<b>2,792.81</b>	<b>312.91*</b>	<b>846.80*</b>	<b>1,012.55</b>	<b>1,538.21</b>		<b>185.73</b>	<b>411.13</b>	<b>804.90</b>		
<b>RESERVES &amp; CONTINGENCIES:</b>											
Depreciation .....	7,554.17	4,089.73	404.81	772.26	39.66		113.67	2,083.81	50.23		
Deferred Maintenance .....	1,875.00	1,875.00									
Insurance—Fire & E. C. ....	1,095.33	32.86	131.44	273.83	383.36	32.86	120.49	120.49			
County Services: .....	2,180.11	745.60	374.98	222.37	300.86	248.53	45.78	85.02	119.91		\$37.06
Protection .....	\$900.00										
Prof. & Tech. Services .....	250.00										
General Liability Ins. ....	591.16										
Payroll Insurance & FICA .....	438.95										
In Lieu of Taxes .....	7,648.00	3,824.00	191.20	1,147.20	1,147.20	1,147.20	191.20				
Interest on Sponsor's Land Costs .....	697.25	278.90	17.43	104.59		278.90	17.43				
<b>TOTAL RESERVES &amp; CONTINGENCIES:</b> .....	<b>21,049.84*</b>	<b>10,846.09*</b>	<b>1,119.86*</b>	<b>2,520.25*</b>	<b>1,871.06*</b>	<b>1,707.49*</b>	<b>488.57*</b>	<b>2,289.32*</b>	<b>170.14*</b>		<b>37.06*</b>
<b>NET OPERATING PROFIT OR LOSS:</b> .....	<b>18,257.05*</b>	<b>11,159.00*</b>	<b>1,966.66*</b>	<b>1,507.70*</b>	<b>332.87*</b>	<b>1,707.49*</b>	<b>302.84*</b>	<b>1,878.19*</b>	<b>634.76</b>		<b>37.06*</b>

(Note: asterisk (\*) represents figure in red.)

<b>USER UNITS:</b>	<b>137,948 M±</b>	<b>.6463</b>	<b>Rentable sq. ft.</b>
Cost Per Unit (Cash Basis) .....	\$ .0629	\$1.536	sq. ft. per yr.
Cost Per Unit (Including Reserves & Contingencies) .....	\$ .14156	\$2.228	sq. ft. per yr.

<b>ANALYSIS OF LANDING AREA COSTS FOR (3) MONTHS ENDING 9-30-59:</b>	
Chargeable Costs (Cash Basis) .....	\$ 8,682.97
Chargeable Costs (Including Reserves & Contingencies) .....	19,529.06

## RECAP OF LANDING AREA COSTS & INCOME BY USERS: (AIR LINES, MILITARY, CIVIL)

	COSTS	INCOME	PROFIT/LOSS		1,000 lb. Units Landing Weight
Airline: .....	\$ 6,020.13	\$ 3,988.95	\$ 2,031.18*	Airline A .....	25,828
				Airline B .....	16,691
Military: .....	9,817.75	3,375.00	6,442.75*	Local Military .....	19,374
				Itinerant Military .....	49,980
Civil: .....	3,691.18	1,006.11	2,685.07*	Local Civil .....	8,946
				Itinerant Civil .....	17,129
<b>TOTAL</b> .....	<b>\$19,529.06</b>	<b>\$ 8,370.06</b>	<b>\$11,159.00*</b>	<b>Total Landing Weight:</b> .....	<b>137,948</b>

## BREAKDOWN OF USER COSTS, INCLUDING RESERVES & CONTINGENCIES: (LANDING AREA)

	AIR LINES			MILITARY			CIVIL			GRAND TOTAL
	Airline A	Airline B	Total	Local	Itinerant	Total	Local	Itinerant	Total	
1,000 lb. Units Landing Weight: .....	25,828	16,691	42,519	19,374	49,980	69,354	8,946	17,129	26,075	137,948
X \$ .14 per unit: .....	\$3,656.21	\$2,363.92	\$6,020.13	\$2,742.58	\$7,075.17	\$9,817.75	\$1,266.40	\$2,424.78	\$3,691.18	\$19,529.06
Less Cost Recovered .....	2,426.26	1,562.69	3,988.95	3,375.00		3,375.00	503.61	502.50	1,006.11	8,370.06
<b>NET OPERATING PROFIT/LOSS:</b> .....	<b>\$1,229.95*</b>	<b>\$ 801.23*</b>	<b>\$2,031.18*</b>	<b>\$ 632.42</b>	<b>\$7,075.17*</b>	<b>\$6,442.75*</b>	<b>\$ 762.79*</b>	<b>\$1,922.28*</b>	<b>\$2,685.07*</b>	<b>\$11,159.00*</b>
<b>TERMINAL AREA:</b>										
Cost Chargeable To Users (Cash) .....	\$2,481.08									
Reserves & Contingencies .....	1,119.86									
<b>TOTAL:</b> .....	<b>\$3,600.94</b>									



## Stockholm Gets Radar for Turbines

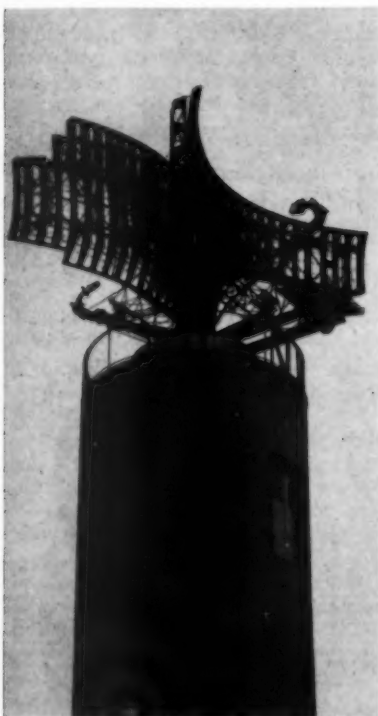
A radar surveillance system designed for use in areas with a high concentration of turboprop and jet traffic has been installed at Stockholm's new international airport at Arlanda.

The radar—dubbed DASR1—is made by Decca Radar, Ltd. It is the first of its type to be installed at a civilian airport.

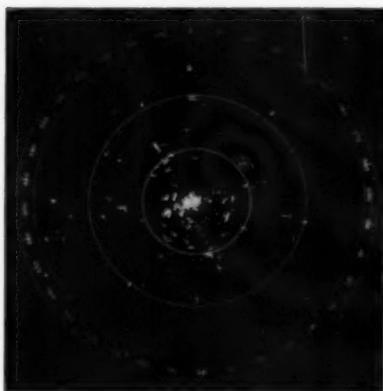
Preliminary tests have indicated effective coverage within a radius of 120 nautical miles. The radar also appears to be effective on small targets at high altitudes, pinpointing jet fighters as high as 40,000 ft.

A characteristic feature of the Arlanda station is the antenna system, with back-to-back dual reflectors, mounted atop a 90 ft. tower. The reflectors rotate 12 times per minute.

"This antenna makes possible continuous surveillance of the horizon," airport spokesmen report. "The information is renewed sufficiently often—12 times per minute—to serve for both surveillance and approach. In the past, two separate installations have been necessary."



Antenna tower for Stockholm's new Decca radar system. Note dual reflectors.



Radar picture showing air traffic around New Arlanda airport and Bromma airport at Stockholm. "Blips" indicate aircraft.

New electronic devices eliminate unwanted echoes from ground structures and from rain and snow in the area, so that the radar screen picture presented traffic control officers is essentially free of this type of "static."

A similar installation is under construction at Gothenburg's international airport, Torslanda, and will be in operation April 1. Bulltofta international airport, at Malmö, will be next in line and will have DASR radar by early 1961.

## Pan Am Installs VHF Link Near Shannon

First unit in a long-range, static-free radio transmission system which PAA is building around the world has been installed at Ballybunion, Ireland, 38 miles from Shannon Airport. It has more than doubled the effective range of VHF radio communications between Atlantic-flying Clippers and PAA's "flight watch" at Shannon. It is the first operational airline VHF ground station to employ "forward scatter," a technique of picking up below-horizon VHF radio signals once believed lost in the atmosphere.

The Ballybunion station will permit radio contact up to 500 miles by VHF, essentially unaffected by "sunspots" or other radio disturbances. Under favorable conditions the station's range has extended up to 800 miles.

A second station is expected to be commissioned soon at Beirut, Lebanon, to cover eastern Mediterranean routes.

Within a year it is hoped to open

yet another station at Gander, Newfoundland. With Ballybunion, it will provide VHF transmission for most of the 1,975 miles between Gander and Shannon. Complete North Atlantic coverage will be achieved with the erection of VHF stations in Greenland and Iceland.

## Transistor Power Packs Replacing Dynamotors

Six lines have won FAA approval to replace the dynamotor used on Collins' 416-N-1 VOR power unit with a PC-8C transistorized supply produced by Flite-Tronics, Inc., Burbank, Calif. Lake Central, Piedmont, Frontier, Central, Bonanza and United States Overseas Airlines are installing the lightweight power supplies.

The move whacks two lbs. off equipment weight on a single instrument. The PC-8C weighs one lb. compared to the conventional dynamotor's three.

But the transistorized unit's main attraction is the reduced maintenance necessary with the all-electronic device and considerably heightened service reliability.

When a dynamotor is overhauled after the usual 1,200 hrs. it has to be completely taken apart and checked. Bearings and brushes often must be replaced; commutators sometimes require lathe turning and polishing. When reassembled, the bearings must be re-lubricated and the unit given a time-consuming break-in before it can be reinstalled.

By contrast, the PC-8C needs only a dusting, and current and voltage checks after 1,200 hrs.

The transistorized unit is physically and electrically interchangeable with conventional dynamotors and can be installed in 15 min.

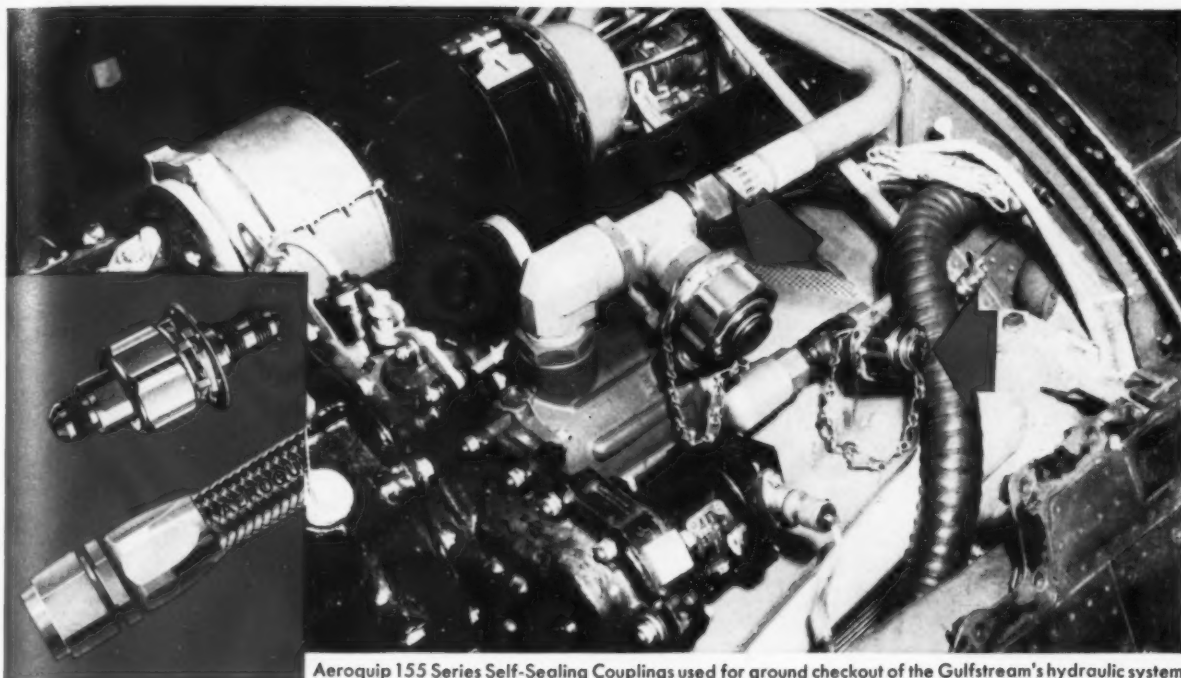
Lake Central plans to replace VOR dynamotors with transistor supplies whenever they come in for major repairs (new armatures or fields).

## AiResearch Modifies 240 For Collins' Doppler Gear

LOS ANGELES—An AiResearch modification of a Convair 240 has equipped the aircraft as a flying test bed for Collins Radio's Doppler radar navigation system.

A 20-inch square "window" was cut in the bottom of the fuselage to accommodate the Doppler system's dielectric lens antenna. The window was firmly sealed to maintain efficiency of the pressurization system.





Aeroquip 155 Series Self-Sealing Couplings used for ground checkout of the Gulfstream's hydraulic system.

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May, 1918 . . . Belgian Ace, Willy Coppens, collides with a balloon in his Hanriot.

## *Early War Birds*—THE HANRIOT HD-1

Although of French design, this World War I scout was flown almost exclusively by the Belgians and Italians. Powered by a 110-h.p. Le Rhône rotary engine, the Hanriot HD-1 had a top speed near 105 m.p.h., an initial rate of climb of approximately 1000 feet per minute to 10,000 feet, and an endurance of 2½ hours. Highly maneuverable, stable, and "a real pleasure to fly", the HD-1 was armed with a single machine gun synchronized to fire through the propeller.

A successful exponent of the Hanriot was the Belgian, Major Willy Coppens, with 36 accredited victories . . . 25 of these over the "hard to get" observation balloon. His fourth victory stands out as one of the more remarkable air engagements of the War.

On the morning of May 15, 1918, Willy Coppens attacked a German balloon out of the sun. He fired three times at point-blank range without effect. Slowing down and flying

even closer, he fired a fourth time when the balloon suddenly shot skyward and collided with his Hanriot. The wheels struck first and the plane tipped forward on top of the balloon. With great presence of mind, Coppens killed the engine. The HD-1 and the balloon began to sink, with the plane slithering across the spongy surface. The plane finally fell free, picking up speed in a dive. When Coppens released the engine cut-off switch, the engine started. He scooted for home with the balloon falling in flames behind him.

On his final victory over a balloon in October, 1918, Willy Coppens' leg was shattered by an incendiary bullet. In spite of the seriousness of his wound, he managed to fly his Hanriot back to the Allied lines and land safely before fainting. When he was discharged from the hospital, the War was over.



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**Rep. Heep:** The reason we have called you in here, Mr. Coughlin, is to aid us in our investigation of payola in the airline industry. You received Christmas gifts from some airline and aircraft manufacturers, did you not?

**Me:** Well, there was an ashtray from Convair.

**Rep. Heep:** I see. You then wrote a favorable story about Convair?

**Me:** No, as a matter of fact, I did one saying the 880 is a real dog.

**Rep. Heep:** And what happened then?

**Me:** A man came and took the ashtray back.

**Rep. Heep:** Any other gifts?

**Me:** Yes, there was a bottle of scotch from one of the airlines.

**Rep. Heep:** You accepted that?

**Me:** No, I sent it back.

**Rep. Heep:** Splendid.

**Me:** I drink bourbon. They ought to know that by now.

**Rep. Heep:** Would you tell me what airline it was.

**Me:** Certainly not. If they think they're going to get any publicity for a lousy bottle of scotch . . .

**Rep. Heep:** Have there been other gifts?

**Me:** There was a bottle of brandy.

**Rep. Heep:** What did you do with that?

**Me:** I drank it.

**Rep. Heep:** You didn't send the bottle back?

**Me:** Empty?

**Rep. Heep:** No, no . . .

**Me:** There's a deposit?

**Rep. Heep:** Please. Have you ever accepted a free trip from an airline, Mr. Coughlin?

**Me:** Yes, I have accepted a free flight on a press junket to Ontario.

**Rep. Heep:** Canada?

**Me:** No, California.

**Rep. Heep:** An airline press junket from Los Angeles to Ontario, California? That's only 30 miles.

**Me:** That's right. The lousy airline was going to fly us to Paris but we lost two engines on takeoff, just barely made it into Ontario and we spent the night sitting on hard wooden benches until they decided to call the whole thing off.

**Rep. Heep:** I see. And the airline got publicity in return for this free trip?

**Me:** Wow, did they!

**Rep. Heep:** Mr. Coughlin, this may be a bit delicate, but has any airline ever offered you, er, approached you with, that is, provided you with girls?

**Me:** Girls?

**Rep. Heep:** Yes, Mr. Coughlin, you do know what girls are, don't you?

**Me:** I refuse to answer on the grounds I may incriminate . . .

**Rep. Heep:** All right, all right. Has any airline ever provided you with girls?

**Me:** Yes.

**Rep. Heep:** I see. And what was the date of that little bit of, er, shall we say, payola?

**Me:** February 10, 1959.

**Rep. Heep:** Just tell us in your own words now, Mr. Coughlin, what exactly happened?

**Me:** Happened?

**Rep. Heep:** Yes, you know, "happened." We are men of the world, after all, aren't we now, Mr. Coughlin?

**Me:** That's a subject all its own.

**Rep. Heep:** Please, Mr. Coughlin, the details.

**Me:** Well, I was sitting there in front of my typewriter when these two girls came in. They said the airline sent them. Their names were Betty and Helen.

**Rep. Heep:** Two girls, Mr. Coughlin?

**Me:** Yup.

**Rep. Heep:** Terrible. What happened?

**Me:** Well, they told me to get all comfy

and then they poured me three or four drinks and fixed dinner.

**Rep. Heep:** Did anything "happen" then, Mr. Coughlin?

**Me:** Not during dinner.

**Rep. Heep:** After dinner?

**Me:** Yes.

**Rep. Heep:** Just tell us in your own words. Every little detail.

**Me:** Well, they gave me a brandy or two after dinner and then turned the lights out . . .

**Rep. Heep:** Disgraceful. You accepted this, er, gratuity, Mr. Coughlin?

**Me:** Certainly.

**Rep. Heep:** There's a name for men like you—and for girls like that.

**Me:** I know. The airline calls me a passenger and calls them stewardesses.

**Rep. Heep:** What?

**Me:** It was a 707 flight, we left Los Angeles at . . . Representative Heep, where are you going? Come back. I thought you wanted the details . . . It was Tuesday, February 10. It was snowing in Los Angeles . . . Rep. Heep? Oh, well, perhaps next year. Brandy, anyone?

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• **How many engines** should a short-range jet transport have? A real sneaky answer to this question comes from Knut Hagrup, vice-president of SAS' engineering department: "The optimum number is more than one!"

It was Hagrup who was largely responsible for the decision to order the Caravelle for short-haul (maximum 1200 nautical miles) routes, the Conqair 600 for routes of up to 3000 miles and the DC-8 for routes where 3000 plus miles are involved.

Hagrup feels that the days of fleet standardization are over. SAS a few years ago used the DC-6 for all routes, short, medium and long. But today, Hagrup says, competition and the narrow margin of profit with which airlines at present operate has forced a program of diversification.

"Aircraft today must be tailor-made for each route pattern," he believes, and notes that this is not all that bad cost-wise since maintenance and overhaul, which would be expected to benefit most from standardization of equipment, represent only about 20% of total costs these days.

• **Discounts from an IATA airline?** Don't rush to call up the IATA enforcement officers. It is all perfectly legal in the case of British European Airways, for the discounts offered are only on domestic routes. There is a

5% discount for more than \$560 worth of travel on BEA domestic routes in one year. After \$2800 the discount goes to 10%. To get the discount the travel has to be purchased with a Credit Travel Order.

• **How about an invitation** for French airline union representatives to visit the United States? Roger Lapeyre, head of the French Federation of Public Works and Transport, told us in Paris the other day that he has made no progress in long drawn out attempts to arrange reciprocal visits between U.S. and French civil aviation personnel. He says that Aeroflot people have visited France as guest of the French union and that a French civil aviation delegation under the sponsorship of his federation recently visited Russia.

This French group picked up some interesting information on Aeroflot salaries. An air hostess earns 2000 roubles for 198 hours work while for the same number of hours a mechanic gets about 1600 roubles and a line captain 7000 roubles.

There is little point in converting the roubles into dollars because the rate of exchange varies considerably. But some idea of the value of these salaries can be established by comparing them with the costs of various consumer items as noted by the French civil aviation delegation: good quality

suit, 750 roubles; one pound of meat, 14 roubles; vacuum cleaner, 400 roubles. Now you work it out.

• **Count us among the fans** of the Boeing 707 Intercontinental. What a fine thing it is to be able to cross the Atlantic non-stop by jet in both directions. Although grossing over 300,000 lbs. our TWA aircraft climbed quite rapidly out of Paris on its long haul toward New York. Coming back we made Idlewild-London in 5 hours 45 minutes!

During the 45-second takeoff runs we looked at the unusual and highly attractive wall covering comprising a series of etchings depicting man's first attempts at controlled flight (and thought about Shelly Berman's comments.)

• **One airport** where an attempt is made to keep passengers entertained during the ground stop is New Delhi's Palam field. We recently made a transit stop at Palam and were impressed to find that the Indian Travel Bureau shows a colored sound movie about the country to passengers while they are waiting through aircraft servicing. After the show officials pass out brochures on India and postcards of famous sights. This is an idea which other airports should follow.

• **One of the main reasons** why BOAC has difficulty showing a profit these days is the heavy losses sustained by its affiliated companies. We did not realize how substantial these losses were until we examined the latest BOAC annual report which covers the 12 months ending March 31, 1959.

The biggest money-loser of the 12 associated companies was Middle East Airlines which was in the red to the extent of more than \$4,800,000, partly due to the 1958 uprising in Lebanon. Second was British West Indian Airways, whose initials BWIA are interpreted by some wags as Britain's West Investment Abroad. BWIA ran up a loss of more than \$1,600,000.

Four other companies each sustained deficits of several hundred thousand dollars while two had losses running into five figures. Three affiliates, however, made a profit, but not very big. The biggest, \$83,303, was made by Aden Airways.

• **No one has yet come up with** a quick, frequent and economic (to both passenger and operator) system of transport between airports in an urban area. The Russians have just started a half-hourly service between the two civil airports of Moscow with LI-2 (DC-3) equipment.

In Paris, as in other Western cities, this would be too expensive although it would certainly be a boon for passengers traveling between Orly and Le Bourget. As things stand at present, the transit passenger has to clear customs and passport control and go into the Paris downtown terminal and then take another bus to the other field. A while back there was an Alouette helicopter link but this was abandoned as too expensive to operate.

In London things are little better. AIRLIFT's Jean-Marie Riche found this out recently when the bus taking him from fogbound London Airport to Gatwick, the British capital's No. 2 field, inched its way through the pea-soup for almost two hours before completing the 30-mile trip.



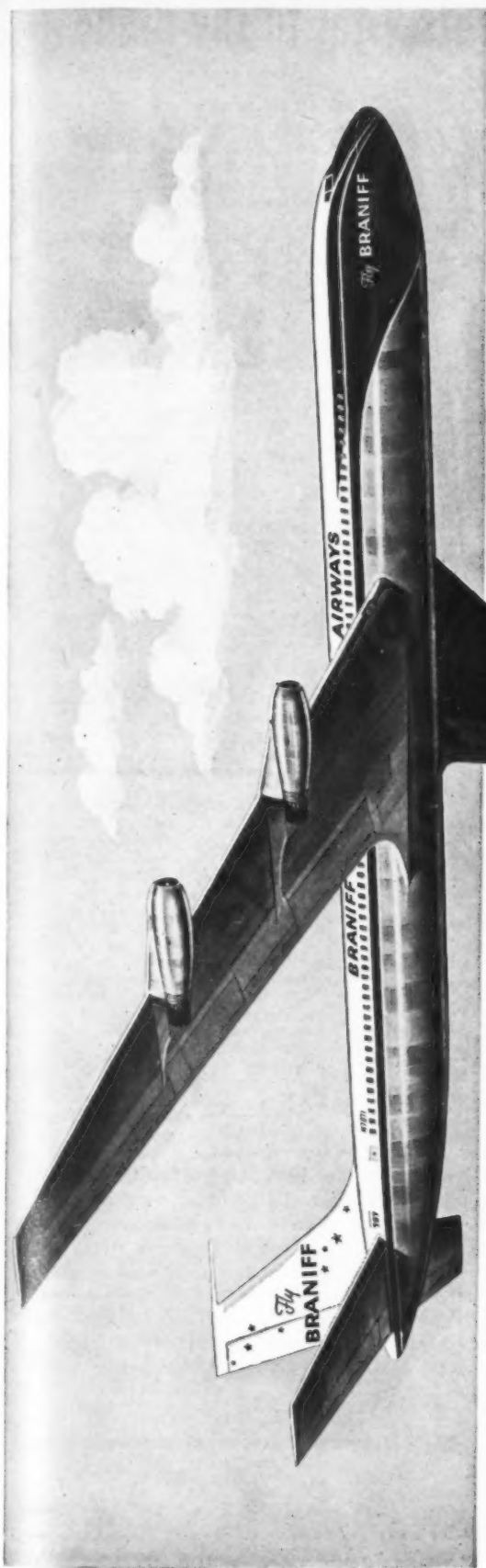
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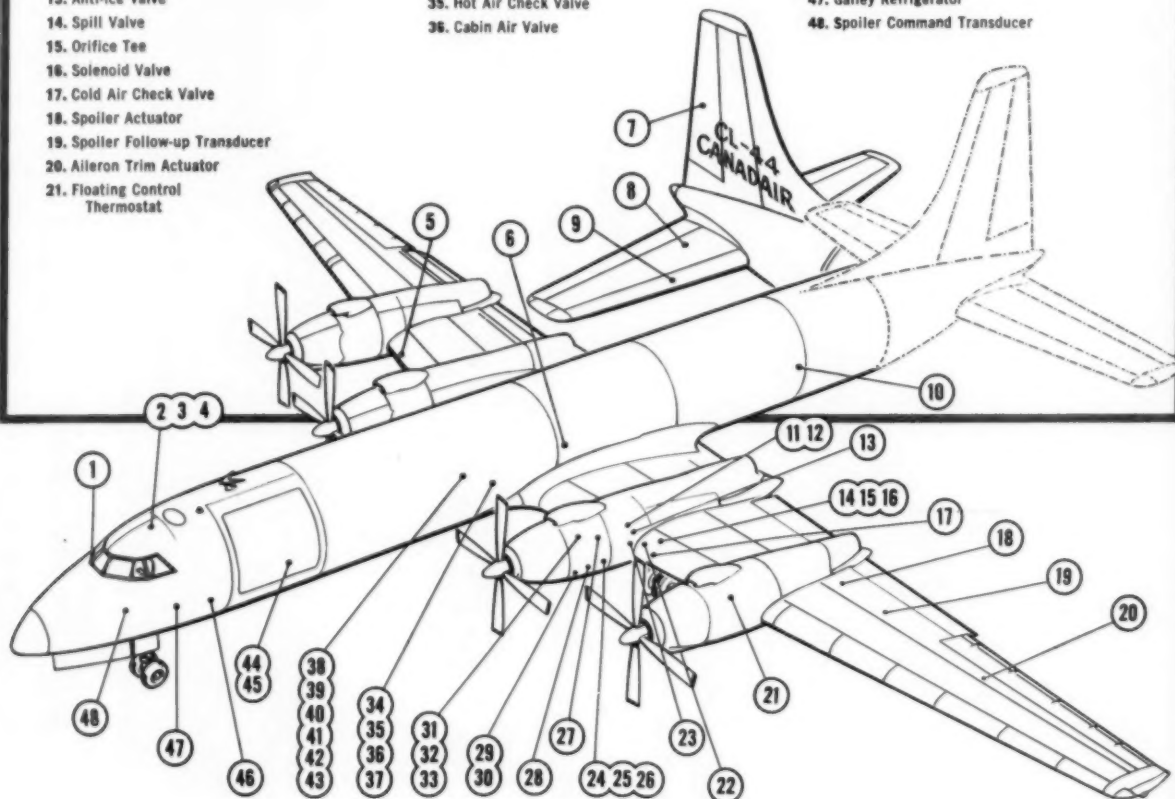
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28. Check Valve
29.  $\Delta$  P Sensor
30. Modulating Hot Air Valve (Wing Anti-icing)
31. Flow Control Sensor
32. Primary Heat Exchanger
33. Floating Control Thermostat
34. Modulating Air Valve
35. Hot Air Check Valve
36. Cabin Air Valve

37. Flight Deck Mix Valve
38. Cabin Duct Anticipator
39. Cabin Magnetic Amplifier Temperature Control
40. Windshield Magnetic Amplifier Temperature Control
41. Elevator Horn Balance Magnetic Amplifier Temperature Control
42. Tail Magnetic Amplifier Temperature Control
43. Wing Magnetic Amplifier Temperature Control
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## IN THE AIRLINES



STARTUP



GOEBEL

More personnel changes in American Airlines' reorganization (*AIRLIFT*, Jan.): **Charles H. Startup**, former asst. v.p.-sales, elected v.p.-passenger sales and service. **Eugene C. Taylor**, former v.p.-maintenance and engineering and chief of Tulsa jet base, is new v.p.-cargo sales and service. **Robert A. Goebel** was upped from asst. v.p. to v.p.-purchasing and stores.

**Charles R. Speers**, former senior v.p.-sales, is now AA's v.p.-advertising. **H. Don Reynolds** shifts from asst. v.p.-gen. traffic mgr. to asst. v.p.-traffic and sales administration. **Samuel C. Dunlap**, former v.p.-cargo, is v.p.-cargo services, and **James M. Glod** advanced from Los Angeles operations mgr. to director of cargo service. **William F. Prigge** transfers from asst. southern regional operations officer to asst. v.p.-passenger service, and **Walter J. Rauscher** becomes director of passenger sales.

Also at American, **William B. Davis** is assuming an "important position" in maintenance-engineering. Davis resigned as director of FAA's Bureau of Flight Standards because of personality clash with Administrator E. R. Quesada.

Reorganization at Northwest splits operations-engineering into two departments: maintenance and station operations, and flight operations. **Frank Judd** switches from v.p.-operations and engineering to v.p.-maintenance and station operations. **K. B. Haugen**, a pilot, is director of flight operations. **Elmer G. Stenborg**, former head of publications division, named director of main base services department.

**Alexander G. "Sandy" Hardy** transferred by National from senior v.p.-Washington to senior v.p.-Miami.

**Mark Kramer**, former v.p.-public affairs of Continental, named v.p.-customer service planning, succeeding **Lynn H. Dennis**, resigned.

**Walter Sternberg**, who resigned as senior v.p.-market development of National, elected a director and executive committee member of South Pacific Air Lines, which opens Honolulu-Tahiti service this spring. He will acquire a financial interest in the company. **Joseph D. Fessio**,

resigned as sales mgr. of Pan American's former Pacific-Alaska division, elected v.p.-sales and service. **Sam Wilson**, former executive v.p. of Transocean, elected v.p. and operations chief. **R. Stanley Dollar, Jr.** is board chairman, with **J. H. Dollar** as president.

**Richard H. King**, one-time v.p.-sales of Aloha and later with Pacific Far East Line and Matson Navigation, returns to Aloha as senior v.p. **Clarence D. Young** resigned as treasurer but will stay as v.p.

**Stewart Faulkner**, Continental's public relations director for 13 years, named gen. mgr. and chief executive officer of Lone Star Airlines, which opens intrastate Dallas-Houston service this month (*AIRLIFT*, Dec.).

Promotions at Los Angeles Airways: **John T. Kane** from treasurer to v.p. and treasurer; **Mervin F. Bagan** named v.p. and continues as asst. to president; **Fred W. Milam** from mgr. of transportation to v.p.-transportation.

**J. O. Jarrard** resigned as TWA's labor relations director to become asst. v.p.-labor relations of Eastern. **Warren C. Gilbert**, EAL's industrial and personnel relations director, elected asst. v.p.-personnel relations.

**M. Willson Offutt**, gen. sales mgr. of Northeast, elected asst. v.p.-gen. sales mgr.

**William W. Hogan**, New York Airways' treasurer since 1952, elected v.p. and treasurer.

**William G. Peppler** named director of engineering for Allegheny; **H. A. Petty** promoted by Lake Central to director of maintenance, and **Walter Ferrari** by Mohawk to asst. director of flight operations.

**W. O. Buehler**, former supt. of system purchasing for United, named to new post of supt. of purchase contracts.

**Rex Werner**, formerly TWA's art director, appointed director of system design. **A. R. D'Agostino** named mgr. of dining service.

## AMONG THE SUPPLIERS

**Kenneth G. Farrar** named v.p.-manufacturing of Douglas Aircraft, succeeding **Frederic W. "Ted" Conant**, who is retiring. Conant will continue as a director. **Harold G. Hynd** succeeds Farrar as v.p.-gen. mgr. of the Long Beach division. **Jesse L. Jones** moves from v.p.-gen. mgr. at Tulsa to the same post at El Segundo.

**J. O. Yeasting**, formerly Boeing's v.p.-finance, is now v.p.-gen. mgr. of the transport division. **J. B. Connelly**, who held that post, is v.p.-asst. gen. mgr. and will devote primary attention to sales and contract administration. **C. B. Gracey**, v.p.-operations at headquarters, becomes v.p.-gen. mgr. of Wichita division replacing **N. D. Showalter**, who returns to head-

quarters as special asst. to the senior v.p.

**Henry W. Boggess**, who has been personnel mgr. for Sinclair Oil & Gas and director of aviation for all Sinclair companies, is now devoting full time to aviation.

## IN THE AGENCIES

Two top-level FAA appointments: **Oscar Bakke**, former director of CAB's Bureau of Safety, takes over as director of FAA's Bureau of Flight Standards. **Joseph H. Tippets**, 22-year veteran with old Bureau of Air Commerce and CAA, promoted from Facilities and Materiel deputy director to director.

## OTHERS IN AVIATION

New management of Railway Express Agency, putting more emphasis on air express, announced four new jobs: **John J. Short**, eastern air express sales mgr., New York; **Arnold H. Brown**, southern mgr., Atlanta; **Stephen J. Kabala**, western mgr., Chicago; **John F. Ireland**, west coast mgr., San Francisco.

**Landis Carr** promoted by Frederick B. Ayer & Associates from sales director to v.p.-sales, succeeding **James C. Welsch**, who resigned to return to private business.

## TWO VETERANS RETIRE



ROCHLEN



MURRAY

**A. M. "Rocky" Rochlen**, v.p. and public relations director of Douglas Aircraft Co., and **James P. Murray**, Boeing's Washington representative for 31 years, are retiring. Rochlen, who organized Douglas' pubrel department in 1937 and who became a v.p. in 1954, has been a leader in aircraft industry public relations. He will continue as a consultant to the company. His successor: **Richard J. Davis**, Douglas' pubrel representative in Washington. **Howard Maginniss**, asst. to the v.p.-public relations, takes over Davis' Washington spot.

**Murray**, one of the nation's first air mail pilots in 1920, who joined Boeing Air Transport as a pilot in 1926, was the dean of Washington aviation reps. He will continue as a v.p. and advisor. **Clifford E. Roberts**, with Boeing 13 years, becomes Washington office mgr.

## LAIGH PARKER DIES

**Laigh C. Parker**, 57, senior v.p. and a director of Delta Air Lines, died in Atlanta following an illness of several months. Prominent in domestic and international traffic affairs, Parker was a 30-year airline veteran. He joined American Airways in 1930 as radio operator and became Delta's gen. traffic mgr. in 1934. He served three terms as president of the Air Traffic Conference.



KRAMER



KING



FARRAR



BOGCESS



## Air France jets were flying before Gigi was born!

Gigi is six. Yet it was *more* than six years ago (February 19, 1953, to be exact) that Air France began flying regularly scheduled pure jet aircraft!

Since then, Air France has logged over 4 million jet passenger miles. First, with the sleek, vibrationless, 500-mile-an-hour Caravelle. And now, Air France has added the fabulous new Boeing 707 Intercontinental to its fast-growing pure jet fleet. The Intercontinental is the world's fastest, largest,

longest-range jetliner crossing the Atlantic non-stop between New York and Paris in only 6½ hours.

The Boeing 707 Intercontinental is the most thoroughly tested airliner in aviation history. First, with thousands of hours of testing on the ground; then, more thousands of hours of actual flights.

Yes, Air France jets were flying before Gigi was born. A reassuring fact to remember whenever you fly overseas on *the world's largest airline*.

**AIR FRANCE JET**  
WORLD'S FASTEST JETLINER / WORLD'S LARGEST AIRLINE





## BAO Favors Delta, NAL For Transcontinentals

Transcontinental routes across the south are favored for National and Delta by CAB's Bureau of Air Operations in the bitterly-fought Southern Transcontinental Service Case.

NAL's Miami-Houston route should be extended to San Francisco via San Antonio, El Paso, Tucson, San Diego and Los Angeles, and Delta's New York-Ft. Worth/Dallas-Houston route from Ft. Worth to Lubbock and Albuquerque and beyond Albuquerque to (1) Los Angeles/Oakland via Phoenix, (2) San Francisco via Las Vegas.

Eastern was favored for a new segment from Atlanta to Dallas/Ft. Worth via Jackson and Shreveport, Braniff for Ft. Worth to Miami/Ft. Lauderdale via Dallas, New Orleans and Tampa/St. Petersburg/Clearwater, and Continental for Houston to Los Angeles/Long Beach via San Antonio and El Paso.

## Three Locals Get Major New Route Awards

Major route awards to Southern, Allegheny and Mohawk were made by CAB in two local service decisions—the Southeastern and Northeastern area cases.

The Southeastern case, with a strong dissent by member G. Joseph Minetti, was announced earlier by press release (AIRLIFT, Aug.). Southern was awarded 19 new cities, increasing its total to 56 and route mileage to 4,658. Principal five-year awards included Nashville to Tri Cities (Bristol, Kingsport, Johnson City), Tri Cities-Huntsville, Nashville-New Orleans, all via intermediates.

Mackey Airlines was awarded Tampa/St. Petersburg-Miami via West Palm Beach/Palm Beach and Ft. Lauderdale. National was extended for five years at Melbourne, Fla., and Panama City was made permanent. Delta and NAL were suspended at several points to be served by Southern.

Minetti blasted CAB's award of Tennessee routes to Southern. He favored Southeast Airlines, intrastate line, which has Convair 240s against Southern's DC-3s.

Allegheny's principal award in the Northeastern case was Washington/Baltimore to Boston via Wilmington, Philadelphia/Camden, Trenton, New York/Newark, Islip, L.I., Bridgeport, New Haven, Hartford/Springfield, New London and Providence, for five years.

Its Harrisburg-Washington route was made permanent, with nonstop rights, and other skip-stop restrictions were removed. The Boston route includes seven new cities and 355 new miles for Allegheny.

Mohawk received new routes from Utica/Rome and Syracuse to Cleveland, from Boston to New York, and from Providence to Binghamton/Endicott/Johnson City, all via intermediates, for three years. Some of Mohawk's existing segments were realigned.

## CAB Says No to Increase In Advertising Trades

Each local service line and the Hawaiian carriers will be allowed to continue to trade \$100,000 worth of transportation a year for advertising, and Alaskan lines will be allowed \$20,000.

CAB refused to raise the locals' limit to \$150,000, and turned down requests to make other changes in the trade agreements. The arrangement "is intended to grant the carriers . . . a limited amount of relief from the need of paying cash for all of their advertising because of their relatively limited funds and their dependence on subsidy. It was never intended to cover the entire cost of . . . advertising programs," CAB said.

## ROUNDUP OF ACTIONS

### ACTIONS

**Delta Air Lines** allowed to eliminate jet surcharge on Chicago-Miami night coach DC-8 flights, despite complaints by Northwest and Eastern. Delta said it is seeking to improve night coach loads by lowering the fares.

**Lake Central Airlines'** voting trust agreement should be terminated, examiner Herbert K. Bryan said. In the absence of any control by Weesner interests, which once controlled the line, and expiration of any right of North Central to acquire LCA, the need for CAB supervision of LCA's affairs has ceased, he added.

**Trans-Canada Air Lines'** foreign air carrier permit should be amended to add New York as a coterminal with Boston on its route from Halifax, examiner Barron Fredericks recommended.

**Wien Alaska Airlines** was denied exemption to serve Fairbanks-Juneau. Present traffic does not warrant entry by exemption of a subsidized carrier in competition with Pan American's non-subsidized service, CAB said. Wien has an application pending for the route.

**Seaboard & Western** denied permission to wet-lease a cargo plane to Air-India International for London-Bombay service. TWA and Pan Am objected. CAB said S&W had not made sufficient demonstra-

tion of the economic necessity for the arrangement.

**Polynesian Airlines Ltd.** New Zealand, should be allowed to operate between American Samoa and New Zealand's Western Samoa, examiner Leslie Donahue said. Permit should remain in effect as long as New Zealand allows Samoan Airlines, or another designated U.S. line, to fly the same route, he added.

**Air France** was recommended for France-Anchorage flights. However, passengers flying the route as part of a Paris-Tokyo journey should not be permitted stopovers in Anchorage, examiner Leslie Donahue said.

**American Airlines** ordered to include the weight of its Paul Bunyan box in assessing and collecting transportation charges when a shipper packs goods in one of the boxes and fails to first package them in accordance with AA's tariff as though the goods were to be shipped by air without the box.

**Bahama Airways** ordered to cease and desist from engaging in foreign air transportation between Miami, Bimini, West End, Freeport and Nassau without a CAB permit.

**CAB** instituted investigation into the need for single-plane service between Wyoming and South Dakota points and Chicago. Braniff, Western and North Central were made parties to the case.

**CAB** approved resolutions of IATA on cargo rates in north, central and south Pacific and Western Hemisphere but said it will reject tariff filings for a number of specific commodity rates which are unsatisfactory. Approval is from Jan. 1, 1960 through Mar. 31, 1961.

## APPLICATIONS

**Pan American** asked for exemption to allow service to Brasilia, which will become the capital of Brazil this spring.

**Aloha Airlines** applied for loan guarantee to cover purchase of three F-27s, increasing its fleet to six. It would raise \$1,025,000 from capital stock sale, \$2.2 million from long-term equipment loan, \$400,000 from long-term airport improvement loan. It would spend \$2,587,150 for F-27s and parts, \$785,000 for airport improvements, \$40,000 for equity capital and financing expenses, and retain \$212,850 for loan repayments and operating requirements.

**Capital Airlines** asked authority to fly New York-Milwaukee and New York-Twin Cities nonstop. CAB now requires Capital to make stops on the routes.

**CAB** was asked to approve a foreign air carrier permit for Compagnie de Transports Aeriens Intercontinentaux (TAI), French carrier, between New Caledonia, Tahiti and Bora-Bora and Honolulu and Los Angeles.

## MAIL RATES

**Los Angeles Airways** denied an increase in temporary mail rate. LAA's scheduled miles have risen and the line has not shown that experimental benefits are derived from a higher level of mileage than CAB formerly recognized, the Board said, adding that if such benefits can be shown an increase will be granted. It set the rate at \$1,063,744 for the year started Oct. 20, 1959, an amount equal to the current final rate.



## The Magnaflux non-destructive inspection system

# New Tools Aid Turbine Checks

Airline overhaul of turbine engines, although still in its infancy, is creating new demands and new techniques in magnetic and fluorescent inspection of engine parts.

Radical differences in the jets from the makeup of their piston predecessors is dictating across-the-board changes in tools, techniques and methods. To meet the challenge, Magnaflux Corp., Chicago-based pioneer in non-destructive inspection equipment, has launched a major development program aimed at bringing inspection methods up to the speed and levels of quality demanded by the jets.

Its scope is far reaching. Instead of dealing with predominantly magnetic materials as were the many gears and bearings of piston engines, the jets present wide varieties of magnetic and non-magnetic parts, sometimes a combination of both. Magnaflux inspection tools, which predominated in piston overhaul, are forced to share an equal role with Zyglu fluorescent penetrant in jet inspection.

Mass production inspection methods, offering rapid shop check of such prolific items as compressor blades and accessory drives, becomes a practicality that didn't exist in piston operations.

United Air Lines, for example, is equipping its overhaul base to handle a minimum of six engines a day. This will involve more than 9,000 parts. Technicians will be checking more than 5,000 compressor blades per day.

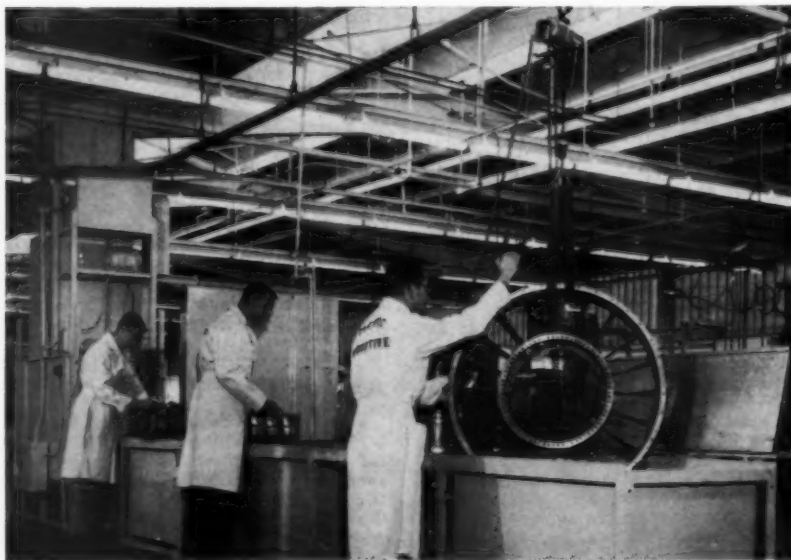
"A pretty significant chunk of man-hours would be involved to go through each of these blades meticulously without retooling for volume production," says Kermit Skeie, western region manager for Magnaflux. After extensive consultation with airlines and engine manufacturers, Magnaflux launched its crash development project to find jet inspection answers.

One result: a special tool employing so-called Duovac principles has been applied to compressor blade inspection. It permits the inspector to magnetize blades in two directions simultaneously within the Magnaflux process.

Next, Magnaflux engineers pushed the sensitivity of Zyglu beyond its past level. The resulting process, called Zyglu Pentrex, produces extreme sensitivity at both ends of the crack spectrum and enables a check of both deep and shallow surface defects, particularly during manufacture. In Pentrex, a special emulsifying agent applied after the penetrant removes the surface excess without danger of washing the penetrant out of suspected areas.

Another Magnaflux jet development is an induced current fixture by which a magnetic field is set up without contacting the surfaces of highly finished jet parts. This eliminates potential damage to parts from "burns" or local overheating that might prove just as serious as a fatigue induced crack.

As a result of this early work, the first set of non-destructive test procedures in the Pratt & Whitney overhaul manual were completely revised recently. Pan American and American, the first to thoroughly retool for jet overhaul, have the new methods down



At Pacific Airmotive Corp., shop technicians (L to R) Davis Lee, Leroy Burgner and Howard Payne operate Magnaflux-built Zyglu-Pentrex equipment.



Inspector Walter Fry operates induced current test unit at UAL turbine overhaul shop.

to a routine. United is close to completion of its new inspection installation and is in an advanced stage of training on inspection methods. Delta and Northwest both have equipment on order.

Among non-airline shops, Southwest Airmotive Co. (Dallas) has new Magnaflux-built inspection equipment for overhaul of Braniff's P&W JT4s as has Pacific Airmotive Corp. (Burbank) for Continental Air Lines' jets.

Beyond present day inspection achievements, Skeie forecasts the development, someday, of means to detect fatigue long before the incipient crack stage. Magnaflux Corp. and other industry inspection equipment specialists are exploring different theories too, he says.

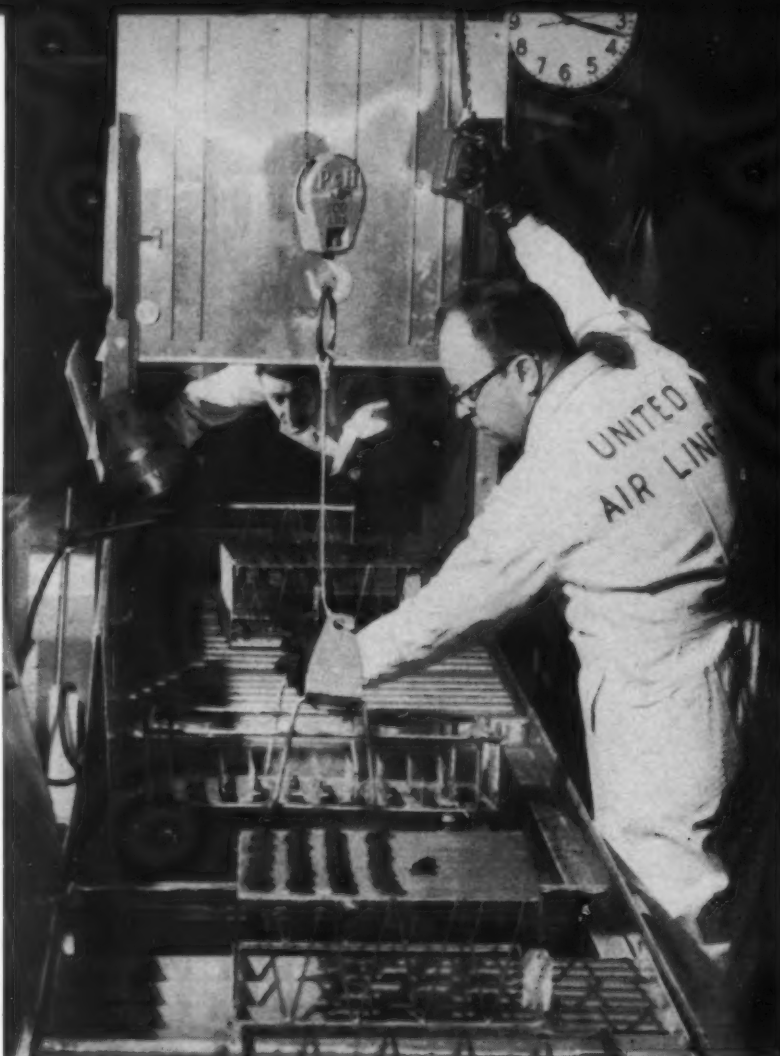
Another, perhaps longer-range objective at Magnaflux is the automation of inspection. "Tools of non-destructive testing are not absolute," Skeie points out. "None of us has found a way to take the man out of the control, eject, reject and acceptance operations so that his time can be reserved for setting up, monitoring and determining standards."

Application of the principle of eddy current testing appears to be a move toward maximum automation. By eliminating the expensive disassembly operation, it appears to have solved an inspection problem no other equipment previously had approached. It has been used successfully in J47 engine inspection and both Magnaflux and United Air Lines collaborated on the successful development of an eddy current test for P&W R2800 piston engine cylinders.

In this process, information on a flaw is derived from the change in impedance of a test coil supplied with alternating current of suitable frequency. Here, however, flaw has a much wider meaning and takes in cracks, voids, fissures, differences in alloy conductivity and hardness. It also reflects the state of heat treatment, eccentricity of tubing and thickness of coatings, should an inspection requirement demand it.

"The entire Magnaflux development program is aimed at giving the inspector every indication we can to help him render a judgment," says Skeie. "He now has to study every discontinuity and decide whether it is a defect. This often isn't easy as no material is perfect—each piece of metal is nothing but a big bunch of discontinuities strung together."

"We've given him tools now to speed up his work and the production line developments for jets are the first move toward setting some arbitrary standards that will separate a defect from a discontinuity."



UAL Mechanics Bob Bolen (foreground) and Don Arcune dip compressor blades into hot water rinse tank, prior to Magnaflux black light inspection.



Edmond C. Shead uses Magnaflux equipment to check engine subassembly at AA's Tulsa base.



Eddy current test on piston engine helps Pacific Airmotive locate cylinder head cracks.





# FOR POWER AND ECONOMY ROLLS-ROYCE TYNE PROP-JETS *were chosen for the* CANADAIR CL-44



## HIGH TAKE-OFF POWER

*5730 e.h.p. makes possible the lifting of heavy loads.*

## LOW ENGINE WEIGHT

*2124 lb., gives increased payload.*

## LOW SPECIFIC FUEL CONSUMPTION

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THE WALL STREET JOURNAL :—

*"The CL-44 has been engineered by Canadair and fitted with Rolls-Royce Tyne 12 engines—probably one of the most efficient turbo-prop power sources yet developed and key to the economy promised by the air-freighter."*

Canadair CL-44's have been ordered for the Royal Canadian Air Force, The Flying Tiger Line and Seaboard & Western Airlines.

Rolls-Royce Tynes have also been chosen for other leading prop-jet aircraft, notably the Vickers Vanguard (ordered by Trans-Canada Air Lines and British European Airways), the Short Britannic 3 (for the Royal Air Force) and the Fairey Rotodyne.

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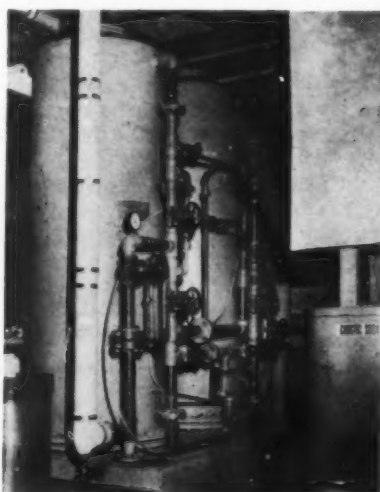






REF Mfg. Corp.'s Liquispenser (shown above, in operation by American Airlines hostess Lise Dontigny) makes eight cups of coffee in three minutes. Versatile device is compact (24 by 21 by 6 1/4 in.), and designed for use in pressurized cabins, but will operate non-pressurized to 20,000 ft. It supplies hot water at 190F, drinking water at 50-55F.

Write: Dept. A/L, REF Manufacturing Corp., 393 Jericho Turnpike, Mineola, L.I., New York.



### Water Demineralizer

One-hundred-gallon-per-minute unit built by Penfield Mfg. Co., Inc., Meriden, Conn., is used by Pan American at Idle-

wild. It reduces 53-part-per-million solids of New York water supply to 5-parts-per-million, well below PAA's minimum of 10-

parts-per-million.

The unit cost PAA \$7,000, but it contains purifying resins which can be regenerated and used again. Demineralized water is fed into plastic-lined tank truck which services 707's 705-gal. reservoir.

Penfield makes demineralizers in variety of sizes, from laboratory models at \$100 to \$50,000 multi-column units. Penfield equipment is also used by service companies (oil suppliers) servicing jet aircraft for other airlines.

Write: Dept. A/L, Penfield Manufacturing Co., Inc., Meriden, Conn.

### NEW PRODUCTS



### Commuter Seats

Burns Aero Seat Co. is marketing Aero-bus "Commuter" series seats for airline and executive use. Low weight of seats (average, 9 lb. per passenger place) permits increase in passenger capacity.

Underseat clearance suggests spacing of 30 to 32 in. Seats are interchangeable between aircraft types, and are available with variety of trim and finish.

Write: Dept. A/L, Burns Aero Seat Co., Inc., 3900 Cohasset St., P. O. Box 127, Burbank, Calif.

### Pre-Oiler

Narda Hydraulics Corp. has made first delivery of pre-oiler unit to Lockheed Aircraft Service at Idlewild. Unit is designed to deliver hot oil under pressure for pre-oiling of aircraft engines prior to initial runup.

It is also suitable for applying preservation compounds to jet and reciprocating engines, oil pumps, hydraulic lines and other aircraft system components.

Equipment adapts to any aircraft engine, will heat and pump any grade of oil.

Write: Dept. A/L, Narda Hydraulics Corp., 122 Herricks Road, Mineola, L.I., New York.

### Aircraft Recovering

A newly developed synthetic fabric called "Ceconite" for recovering aircraft

Continued on page 67

Give Your AD ADded Thrust . . .



by **airlift**ing it in the 11TH ANNUAL MAY 1960

## AIR TRANSPORT PROGRESS Issue

### Advertising Impact

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This year's theme will be First Report on Jets—reflecting for the first time the large-scale operation of turbine transports on the world airline scene and detailing all facets including traffic and sales, operations, maintenance, overhaul, operating costs.

### Editorial features will include:

- **THE ADVENT OF JETS**—A comprehensive analysis of the initial effects of the turbines, including specific data on results.
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- **TURBINE COSTS**—An exclusive AIRLIFT analysis of the first full year of turbine operating costs including Boeing 707, Douglas DC-8, Lockheed Electra, Fairchild F-27, Convair 540 and the Vickers Viscount.
- **LOCAL SERVICE INVENTORY**—A complete report on local airline activities, growth, new routes, new equipment, traffic and financial statistics.

- **TRAFFIC ANALYSIS**—First Class vs. Coach. A report on the year-by-year rise in the percentage of coach passengers in the total air traffic picture.
- **AIR TRANSPORT U.S.A.**—An appraisal of U.S. Airlines by class of carrier including rankings of airlines in passenger miles, passengers, mail, express and freight.
- **INTERNATIONAL AIRLINE ROUNDUP**—Carrier by-carrier report on results for 1959 and outlook for 1960 based on an exclusive AIRLIFT survey.
- **AIR CARGO REPORT**—Complete '59 record and a look at what's ahead in 1960. Included are statistics for mail, freight and express.

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is now being marketed by Cooper Engineering Co., Van Nuys, Calif. It is described as being less expensive than the new metal or glass processes. For the same weight, it is reported as being twice as strong and will outlast cotton three to one. It contains no glass and is said to have flexural qualities superior to cotton. It is not affected by climatic changes, gasoline, oil or chemicals used for dusting. The company says fabrication and repairs may be accomplished by any A & E mechanic.

Write: Dept. A/L, Cooper Engineering Co., Van Nuys, Calif.



### Work Stand

"Hi-Lo" work stand, by Forces, Inc., comes in two sections, hinged for operating height of two or four ft. Either position presents flat work top. Stand is light weight, and easy to move via two large rubber wheels.

Essentially no maintenance is required. Stand comes in either magnesium alloy or aluminum. Treated plywood tops are standard, metal tops are available on special order.

Write: Dept. A/L, Forces Inc., 4 Henshaw Street, Woburn, Mass.

### INFO FOR THE ASKING

**Executive seats**—Booklet describing new line of seats for executive aircraft.

Write: Dept. A/L, Burns Aero Seat Co., 3900 Cohasset St., P. O. Box 127, Burbank, Calif.

**Molecular sieves**—Brochure on hazard of water in jet fuel and how it can be combatted through use of Linde Co.'s molecular sieves.

Write: Dept. A/L, Linde Co., New Products Dept., Division UCC, 30 East 42 Street, New York 17, N.Y.

**Rivet insert**—A 4-page brochure on Hi-Shear Rivet's S110 insert tells how hole preparation costs can be trimmed with S110 inserts.

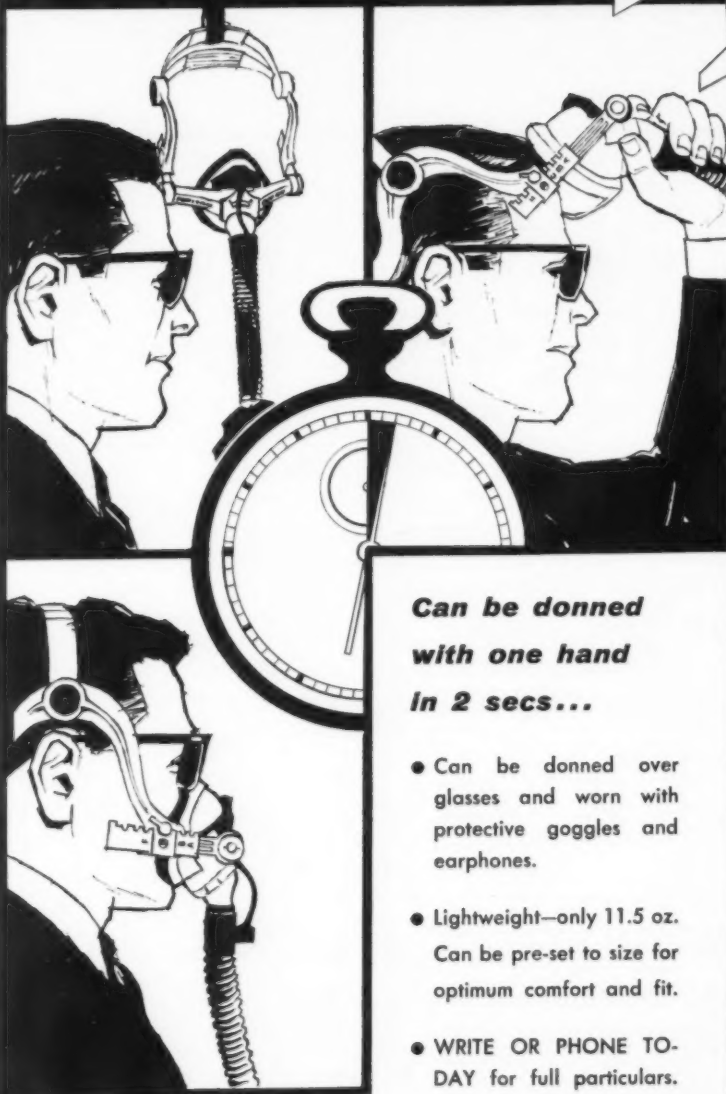
Write: Dept. A/L, Hi-Shear Rivet Tool Co., 2600 W. 247th St., Torrance, Calif.

**Ground velocity indicator**—Brochure describes Ryan's AN/APN-122(V) and is the first of a series on specific Ryan instruments. Doppler unit is now in production.

Write: Dept. A/L, Ryan Aeronautical Co., Lindbergh Field, San Diego 12, Calif.

**Recipe book** covering the foods served on its extra fare Captain's Flagship Electra flights has been issued by Ameri-

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Write: Dept. A/L, American Airlines, Inc., Public Relations Dept., 100 Park Ave., New York 17, N.Y.

## FOR YOUR BOOKSHELF

**Doppler standards**—Booklet sets forth minimum performance standards for airborne doppler radar, ground speed and/or drift angle measuring equipment. RTCA Paper 166-59/DO-98 costs 40 cents, from RTCA Secretariat, Room 1072, T-5, Washington 25, D.C.

**Preliminary instruction**—Free booklet titled "Jet Age Flight" for sixth grade

through high school describes typical flight, is designed to accompany 32-frame filmstrip (service charge: \$1). Booklet is available from School and College Service, United Air Lines, 5959 South Cicero Avenue, Chicago 38. Film strip may be obtained from Society for Visual Education, 1345 West Diversey Parkway, Chicago 14.

**FAA has published** a 7-page safety release (No. 434) outlining flight control hazards and protection from icing. Request from: Bureau of Flight Standards, FAA, Washington 25, D.C.

**Engineers, take note**—University of Miami has published a comprehensive 26-page report on "Utilization of Aviation Engineering Personnel" with emphasis on air-

line engineering. Write R. M. Kane, University of Miami, Coral Gables 46, Fla. for details on availability.

**The New Private Pilot**, John Dohm; Pan-American Navigation Service, 12021 Ventura Blvd., North Hollywood, Calif.; \$4.95. For the student pilot learning basic techniques this manual provides background data on flight theory, powerplants, safety, air traffic control, radio, meteorology, cross-country navigation and other essentials, is designed to help the private pilot-to-be pass FAA certification exams.

## NOTES ABOUT SUPPLIERS

• Charles Butler Associates has been hired by Capital Airlines to style interior of new Electras. Hamilton Standard will provide propellers.

• Pacific Airmotive will overhaul Westinghouse Air Brake's aircraft anti-skid equipment. Agreement covers Decelostat and Maxaret anti-skid units in western U.S., Canada, Mexico and Far East.

• Hamilton Standard will purchase half interest in Microtecnica, Inc., Turin, Italy. Microtecnica makes aircraft navigation instruments, test instruments and synchro and servo-mechanisms.

• Lockheed has acquired an interest in Aeronautica Macchi, S.A., of Italy. Aeronautica Macchi will produce a new Lockheed-designed light utility aircraft.

• Delta Air Lines has ordered 21 "Clarktor 225" towing tractors from Clark Equipment Co.'s Industrial Truck Div., in Battle Creek, Mich., to supplement 11 225's already in service. Tractors will be used with DC-8's and Convair 880s.

• The first Grumman Gulfstream outfitted with AiResearch interior has been delivered to Continental Oil Co., Houston.

• Collins Radio Co. has order from TransCanada for 11 doppler radar navigation systems and associated test equipment. Contract totals \$231,000. Units are for TCA's six DC-8s now on order. Five are spares. Deliveries begin this year. Earlier, Bendix Radio Division notched the first U.S. doppler order with UAL purchase of five DRA-12 systems.

Irish Airlines ordered nine Canadian Marconi CMA-623 systems for dual installation in its fleet of Boeing 707s.

• Motorola has exchanged stock for business and assets of executive and personal aircraft products of Lear, Inc.'s LearCal division in Santa Monica. Lear will continue to manufacture transport and military autopilot, flight controls and instrument equipment. Transfer will enable Lear to expand activities in air transport.

• Greer Hydraulics, Inc., N.Y. International Airport, is moving R&D and production facilities in ground support equipment and hydraulics systems to Los Angeles early this year. New facilities will be 50,000 sq. ft. plant at 5930 W. Jefferson Blvd.

• Lightweight AiResearch turbocharger has been matched to Franklin 6VS-335 helicopter engine, enabling it to maintain 225 hp sea-level rating to 150,000 ft. Work was joint project of AiResearch and Aircooled Motors, Inc.

# Sales Administrator

One of the country's growing electronic firms in the eastern section of the United States has an outstanding opportunity for a Sales Administrator. Individual would report to Sales Manager and be responsible for direction and coordination of sales engineers' activities. Individual should have EE degree and/or commercial pilot background with 4-6 years sales administration experience.

Send detailed resume, indicating education, experience and salary requirement, to Box 197, Airlift Magazine, 1001 Vermont Ave., N.W., Wash. 5, D.C.

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## New Delhi Mice Win Scramble for Hotel Suite

Now I have no real complaint about most of the living creatures on this earth but I do become a little intolerant when I have to fight some bold mice for my breakfast.

In India you're never very far from nature. The Hindu religion is against harming living things, at least for the most part, with the result that a few conflicts may develop from time to time. Cows, for example, wander around the towns, into stores and shops, and the most that ever happens is that they are sometimes shoved away. (A large part of India's critical food problem could be solved easily if it weren't for religious beliefs and customs).

When I planned my trip to New Delhi, for the 1958 IATA meetings, I reserved a room at a first class hotel in the residential section by the name of Claridge's. Since I wanted a suite, the IATA functionaries who dislike having press and manufacturing reps anywhere within a thousand miles, saw to it that I was blocked out of the big modern government hotel, the Ashoka, on grounds that all suites were reserved for IATA, a restriction which I found later to be pure malarkey. (This was only a small part of the IATA press snafu in India, but we'll skip the rest).

Arriving late at night, but with a reservation of six to eight months' standing, my wife and I were given a room on the main floor, about the least desirable to be had since others from the U.S. enjoyed satisfactory quarters on higher floors. Rather dreary it was, all in all. But I am not one to complain about quarters until circumstances and animal life gets out of control.

### Patter of little feet

No sooner had we unpacked and gotten to bed than an unholy racket began. The patter of little feet could be heard back of the bedstead. Papers were rustling elsewhere. It was obvious we had company, quite a bit of it. So a quick switch of the light caught one mouse in the open and we knew who was the company. We closed up our bags and got to sleep in spite of the racket.

Next morning I ordered breakfast and sat down to read my mail and the paper. When breakfast came I had just started to eat when the phone rang. It was a sorry mistake to leave the parlor and pick up the phone in the bedroom, because those mice are pretty clever. Not dumb at all. And hungry. I had to get back and guard the tray because those were the boldest, brashiest and most impertinent mice I had ever seen. (There were also some shrews, diminutive mouse-like animals, small eyes, long snouts and velvety fur, who walk on hind legs. Both shrews and mice were active in daytime as well as at night.)

Not wanting to go through another

night with so much company in the room, I informed the hotel management. Nobody was surprised, but I was wholly unprepared for what followed. In came a half-dozen flunkies armed with brooms, sticks and other equipment. They literally tore the room apart. Off the bed went pillows and mattresses. Off went sofa cushions. All were beaten with sticks. It was a charge of the last brigade. To kill the mice? Certainly not. Only to scare the mice into leaving the room, or if possible, merely to catch them. Ever so often a mouse would dash out from one hideaway and rush to another. Results were zero. Not a mouse exited or was caught. The suite was a mess.

### Antique mouse trap

Next came a trap. Now please understand, this was not an ordinary mouse-trap which catches a mouse and knocks him dead. Not in India. This was a big box-like affair invented somewhere about 850 A.D. designed to lure a mouse into an inner cage, and trapped, so that the box could be taken outdoors and opened to let the mouse out to continue his life of pilferage. But our mice and their millions of ancestors knew this trap well. As it turned out, they could enter leisurely, eat the food, and casually walk out again. No amateurs, these.

My wife had a better idea. Just leave out some food for the blokes, make them fat and contented, and they wouldn't be trying to eat their way through to our chocolate bars in our bags. Matter of fact, this worked pretty well. On the second night the mice were much quieter.

One resident of the hotel, who had occupied our ground-floor room at one time, asked us which window we opened. We told him the screened one. Good, he said. And fortunate. On his first night there he had opened a window without a screen and a monkey had dropped in and created one helluva havoc and thought the effort to get him out was just one swell game in which he took great delight. For your information, monkeys are not only populous in the Delhi area but since they have been well protected they are firmly of the conviction that they, along with all other creatures, own the place.

On the whole, Claridge's isn't a bad inn and it is in the first class category, but what with poor mail and message service, and my lousy ground-floor location, I thought the time had arrived, even belatedly, to move out. So I got an excellent suite at the Ashoka—easily, despite IATA—and moved over. This is a hotel that can be highly recommended. It is big, modern, and de luxe. It was built by the government and has a no tipping rule which works some of the time.

The Ashoka's main shortcoming is the confusion at the front desk. All at one

counter are registration, cables, mail, stamps and inquiries. House phones are too far away. The newsstand is far away and very poor. The excellent, spacious dining room (service is excellent) has a fine dinner menu but a very poor luncheon one for westerners. If the Ashoka would reorganize its front desk and fix up a western-style grill featuring light snacks and good coffee, the place would be just right. But beware of some of the shop concessions. Those gems may turn out to be pieces of fine glass when you get them home for appraisal. Gem-buying is a risky business in India although India isn't the only such place by any means.

By all odds the high point of the trip to Asia, exceeding anything in the Soviet Union, was an excursion from New Delhi to Katmandu, Nepal. Thanks to Jules Gindraux, TWA's alert district sales manager based in Bombay, we got visas, reservations and hotel accommodations lined up in pretty fast order. And my wife and I had some fine company in the person of S. Ralph Cohen, the likeable and capable director of public relations of IATA, who also wanted to visit that hidden mysterious kingdom located between India and Tibet.

It isn't exactly the easiest place to get to. Until a couple of years ago, there wasn't even a road into Nepal and even now it's a rough, hazardous trip by car—a real adventure. By air the only service is one DC-3 of Indian Airlines Corp. six days a week—when the weather is good enough in the mountain pass to get through. I guarantee you some good stories about Nepal, the most fascinating country on the globe as far as my experiences go.

From New Delhi it's 600 miles to the junction at Patna where you leave your Calcutta-bound DC-3 to connect with a DC-3 which comes from Calcutta and continues another 150 miles over the mountains into Nepal.

En route to Patna stops are made at two famed Indian cities; Agra, noted for the wondrously beautiful Taj Mahal, and Benares, the most important Hindu religious city on the Ganges. You get a fine air view of the Taj as you fly over the city, but the Benares airport is too far away for a view of that city and its many temples.

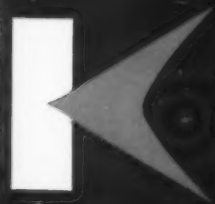
### Hurried departure

The WWP-Cohen expedition got off to a rough start. We arrived at the airport with not much time to spare only to find that the DC-3s use another field on the other side of town. A mad rush resulted and we made the flight—but just. And on board bound as far as Benares were such illustrious executives as Max Hymans and Louis Lesieux, chairman and president respectively of Air France, and Walter Berchtold, president of Swissair, and their wives.

We reached Patna late in the morning. It was hot. The terminal was miserable. Immigration and customs men had their weather-beaten desks on the open porch of the building. Inside was an IAC counter (with the always polite and pleasant IAC personnel) and some old tables and chairs. Flies were plentiful. Overhead fans provided a slight relief. A couple of old bottles of gin and whiskey were on a table for what purported to be bar service. But this unpretentious, unpalatable post was the departure point for a magnificent trip into isolated and beautiful Nepal.



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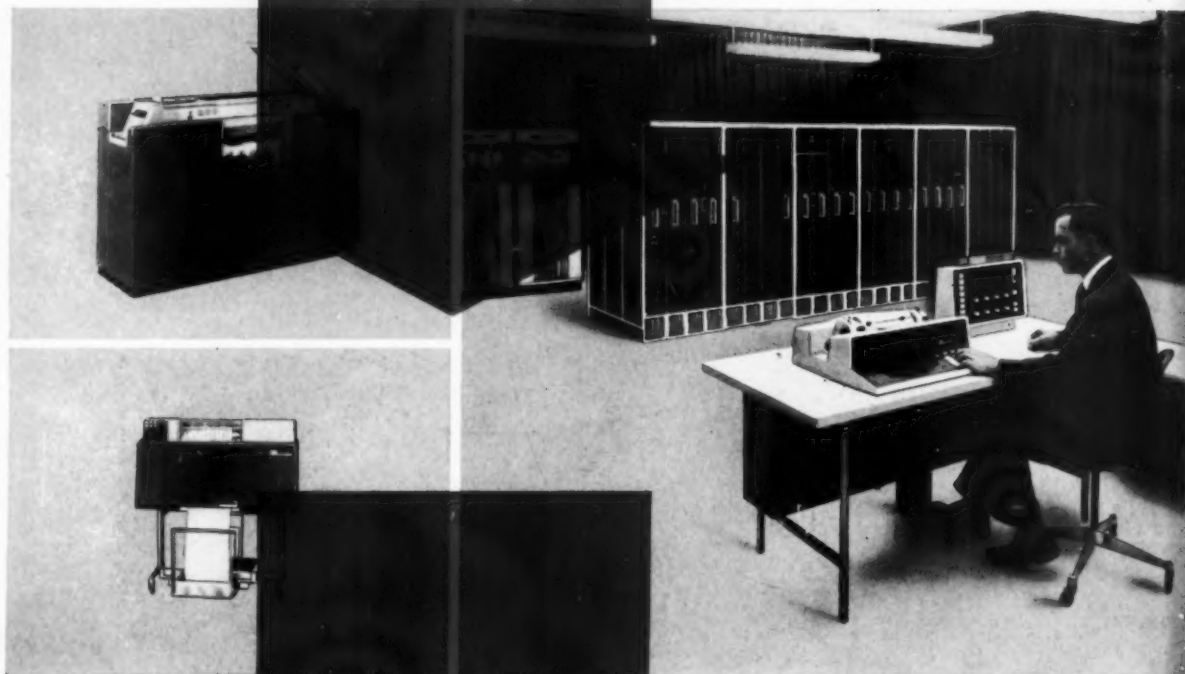
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For full information on the new tape-oriented 7070 call your IBM representative. Like all IBM equipment, the 7070 System may be either purchased or leased.

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